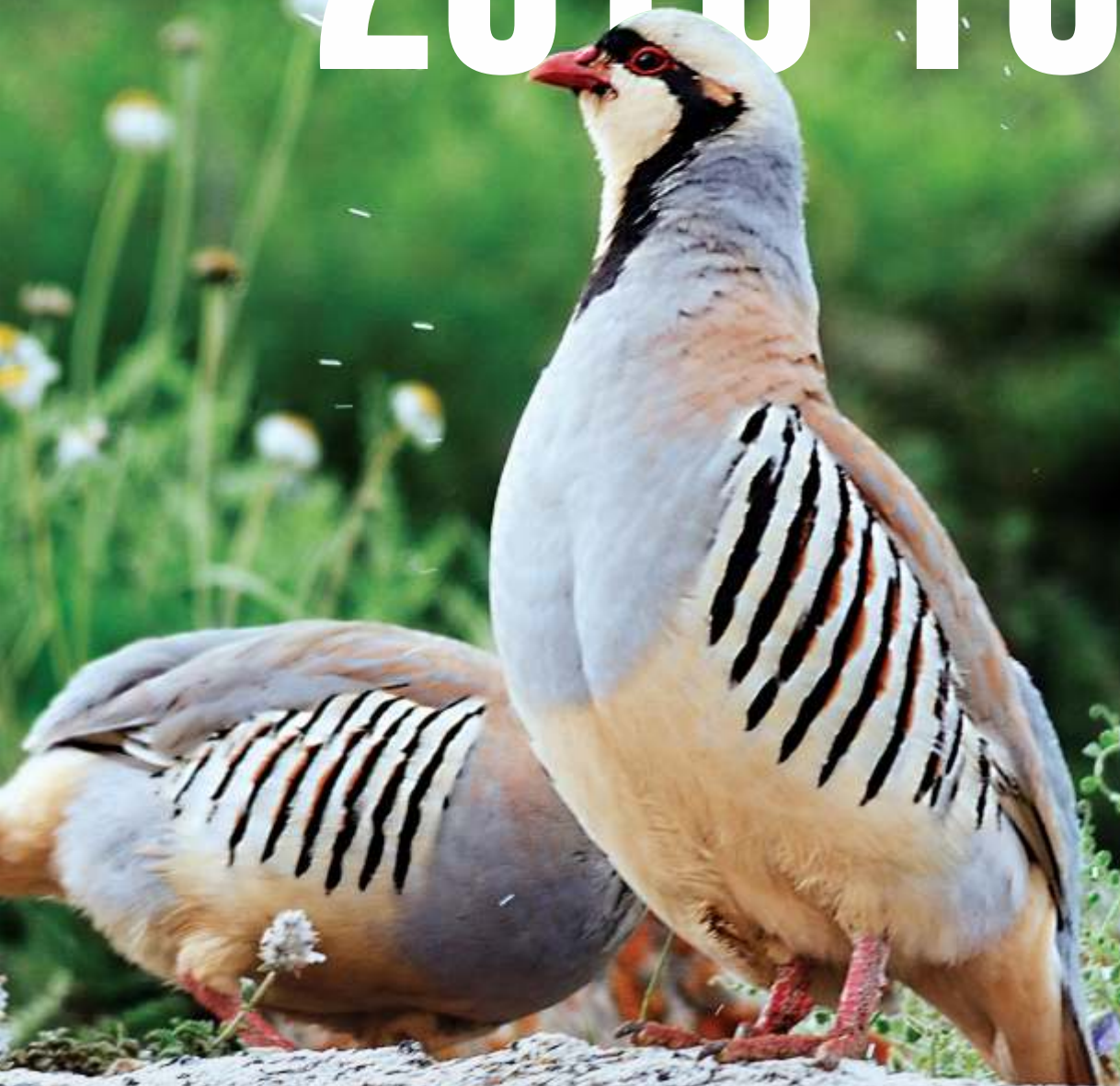




ANNUAL
REPORT

Zoological
Survey
of India

2018-19



2018-19

A N N U A L
R E P O R T

Zoological Survey
of India, 1916



**Zoological
Survey
of India**



ANNUAL REPORT 2018-2019

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VISION

**Taxonomy towards
Conservation and
Sustaining
Biodiversity for future**

MISSION

**To contribute towards the Monitoring
and Conservation of the Fauna by
conducting Status Survey of Wildlife
Protected species, undertaking
Taxonomic Studies and Documenting the
Country's vast Biodiversity**

FROM THE DIRECTOR'S DESK

It is my proud privilege to present the Annual Report 2018-19 of Zoological Survey of India (ZSI) which gives me immense satisfaction that over the years, the organization has made tremendous progress in many frontiers of research. The ZSI is gradually reforming its activities towards the application oriented research while continuing its taxonomical studies.



During the year, the scientists and researchers of ZSI conducted 121 surveys of the ecosystems ranging from deep sea to the high-altitude areas of the Indian Himalaya, falling in varied biogeographic zones of the country. This year ZSI handled 126 in-house programmes and 27 externally funded projects.

The year was highly productive in contribution towards conservation of Biodiversity by playing key role in discovering the unknown biodiversity from the different habitat of the country and long-term monitoring of the same. This year, 104 species new to science were described from different faunal groups as lower primitive organisms such as roundworms and flatworms to the advanced vertebrate animal forms like fishes, amphibia and reptiles. Besides, 55 species were reported as new records to Indian fauna.

Imparting training on the knowledge acquired by ZSI is one of the objectives and it extended 10 trainings to students, researchers, academicians, law enforcing agencies especially on GIS and remote sensing, Wildlife Forensics and Crime Control and Soil Fauna, besides collection, identification and preservation in which 818 people were benefited.

In order to cope up with the advance studies in biodiversity and conservation, in addition to taxonomy, molecular systematics have been strengthened over the years and as a result of it 901 DNA barcodes under 333 species were generated and submitted at BOLD & NCBI in the current year.

Further to add that, significant achievement on the publications of ZSI could be witnessed as 39 books, 112 papers in SCI journals, 44 papers in Foreign journals, 180 papers in Indian scientific journals, 376 Book chapters and 4 issues of Records of ZSI.

I gratefully acknowledge the support rendered by scientists, scientific and administrative staff of ZSI for extending their fullest cooperation in achieving the objectives of the organization in an appreciable manner.

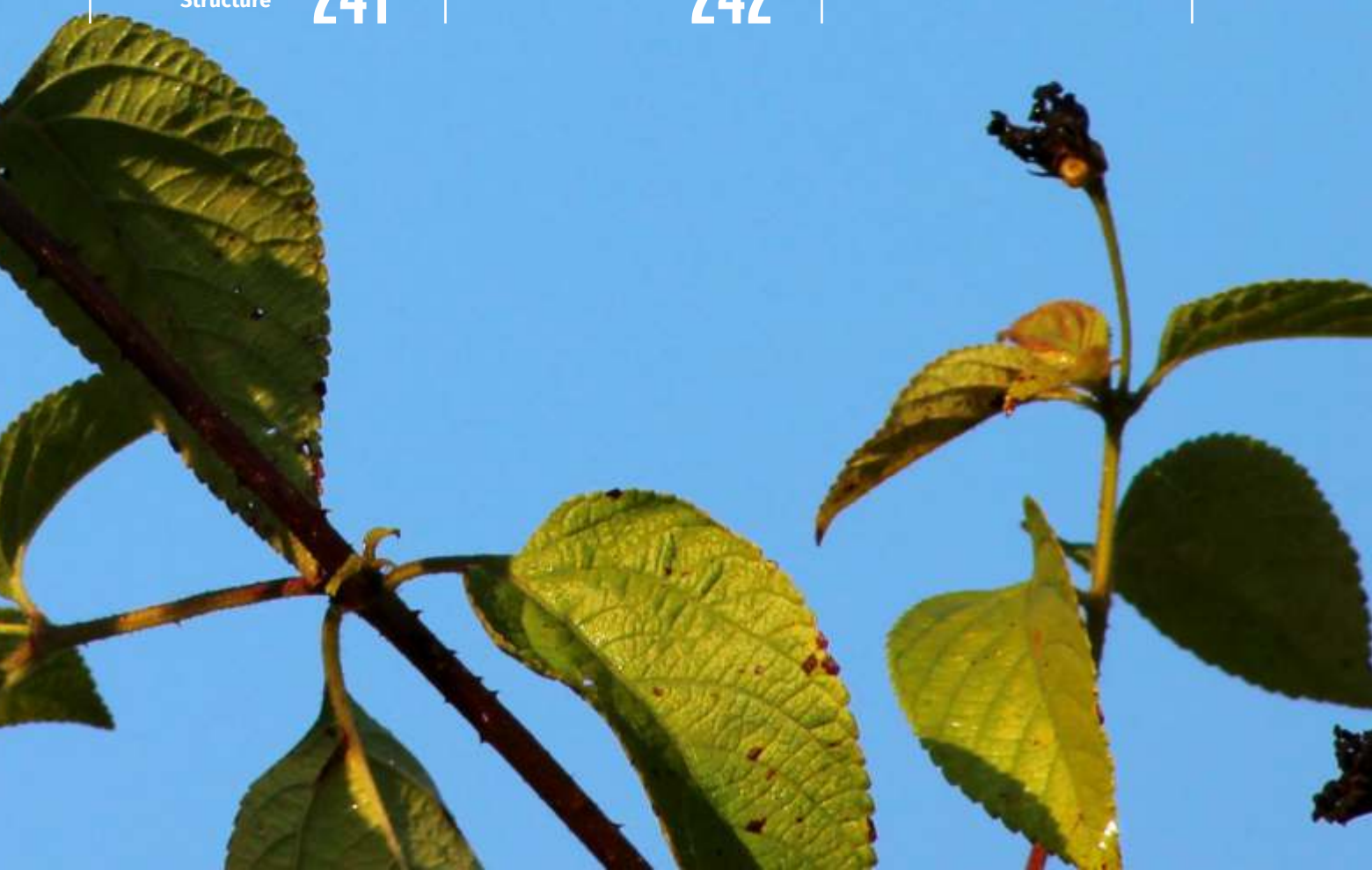


(Kailash Chandra)

CONTENTS



Executive Summary	008	Introduction	012	Research Programmes: Headquarters	030
Research Programmes: Regional Centres	048	Externally Funded Projects	092	Surveys	110
New Discoveries	114	Publications	122	DNA Barcodes Submitted To BOLD/NCBI	166
Capacity Building	190	Library & Publication Division	196	Museum And Taxidermy Division	200
Identification & Advisory Services	204	Identification Of Confiscated Wildlife Materials	212	International Participation	216
Seminars, Conferences, Workshops & Meetings	220	Events & Activities	234	Infrastructure Developments	238
Organizational Structure	241	Accounts	242		



EXECUTIVE SUMMARY

With the prime objective of exploring unexplored faunal resources of India, Zoological Survey of India [ZSI] initiated the documentation of animals from high mountains to deep sea environments since its inception in the year 1916. The ZSI is functioning under the Ministry of Environment, Forest and Climate Change, Government of India and providing inputs to policy related matters by assessing the status of faunal communities, conducting the studies in protected areas for conservation of endangered, endemic and vulnerable animals, measuring the impact of climate change on biodiversity, conducting forensic investigation on confiscated animals to curb wildlife crime, assessing the environmental impact for the upcoming developmental projects in the ecologically sensitive areas etc.,

Having the vast jurisdiction of 287 million square kilometres in land and 2.172 million square kilometres in ocean in India and its EEZ, the ZSI is undertaking studies in the broad thematic areas such as Exploration of Faunal Resources of India, State Fauna, Fauna of Conservation area, Status survey, Ecology and Behavioural Studies and Taxonomical Studies. Documentation of fauna in State and UTs of India is one of the important tasks of ZSI in which 22 States have already been published and in the current year Fauna of Punjab, Fauna of Haryana, Fauna of Assam and Fauna of Chandigarh are taken up to compile the data through survey based information. Further the surveys were intensified to document the animals in terrestrial and marine ecosystem of Lakshadweep. In order to cover the ecologically fragile ecosystems, the inventorization is under completion in Western Ghats, Trans Himalayas, Bhoj wetlands, Daman, Diu & Dadra Nagar Haveli, Satkosia Baisapally WLS, Neora Valley NP, Mahananda WLS, Gorumara NP, Chapramari WLS and few more protected areas. The surveys in expedition mode have also been conducted in the tough terrain of Great Nicobar Biosphere Reserve in A & N Islands and Dihang-Dibang Biosphere Reserve in Arunachal Pradesh by involving several scientists to cover most of the faunal groups.

Existing in its pan India presence, during the financial year 2018-19 alone 126 scientific programmes and 27 externally funded projects have been handled by ZSI Headquarters and its Regional Centres. Altogether 121 long-term surveys and several short-term local surveys in various ecosystems of the Nation were completed during the year 2018-19. Regional Centres of ZSI made 78 surveys within their jurisdiction and the headquarters conducted 43 surveys covering different States of the Country. The surveys covered a vast areas in terrestrial, wetland, marine and freshwater regions to the extent of 31,355 square kilometres. To assess the biodiversity of protected areas, 15 National Parks and 30 Wildlife Sanctuaries have also been surveyed during the year.

The voucher specimens are serving as a reference material for the taxonomists, academicians and researchers for authentic identification in documenting biodiversity. The current year surveys added 166203 examples of voucher specimens under 32 different faunal groups in the National Zoological Collections. Among the specimens collected, 62475 specimens were taxonomically identified up to species level and registered in the repositories. Digitization is one of the significant activities of ZSI, in which the taxonomically identified species and specimens are being digitized with the habitat details for the benefit of the needy.

Every year ZSI is providing updated information about the faunal diversity of India, and currently it reached to 1,01,681 species. However, this year alone ZSI was able to identify 1876 species comprising 48 minor groups of animals thriving at different realms in hydrosphere, lithosphere and atmosphere. Among them 104 species are newly described by the scientists of ZSI while 55 species found as first report to India.

The identification and advisory services is one of the important activities of ZSI which provide useful information to large section of society. Besides law enforcing agencies, universities, institutions, students and researchers are getting benefitted out of this service. During the year, 3444 specimens and 260 photographs were identified for 105 different institutions while 24 services have been provided exclusively for confiscated material of different animals or parts of the body for the benefit of Court of law to culminate the wildlife crime. In addition, 2760 faunal specimens under different groups were identified exclusively for the students of various universities.





The key findings of ZSI are being published periodically either in the forms of books or papers in different journals or book chapters. Altogether 755 publications have been made during the year, of which 39 books, 112 papers in SCI journals, 44 papers in foreign journals, 180 papers in Indian scientific journals, 376 Book chapters and 4 issues of Records of ZSI are noteworthy. The few books especially Biogeographic Zones, Himalayas and Islands are the comprehensive documents which disseminate complete list of species.

Imparting training is prerequisite to build the career of budding researchers/scientists for which ZSI play a pivotal role by organizing a series of training programmes, seminars, workshops, conferences on different thematic areas free of cost for the benefit of wide array of people right from students, researchers and academicians to the wildlife conservators, managers, law enforcing authorities and policy makers. Current year alone 10 such programme have been conducted, which include the Third International Conference on Status and Protection of Coral reef, 2018 (STAPCOR-2018) organized on 22-24 October, 2018 at Bangaram Island, UT of Lakshadweep, under the project 'Conservation and Management of coral reefs In Lakshadweep Islands - Long-term monitoring programme. Besides participation from the Nation, experts from United State of America, United Kingdom, Kuwait, Italy, France, Maldives, and Sri Lanka also participated in the conference. In addition, the training programmes conducted on GIS and Remote Sensing, and Wildlife Forensics and Crime Control are new initiatives from ZSI during the year.

ZSI is committed to barcode all the Indian faunal species through DNA molecular tool. Initially special emphasis given to new species, rare, threatened, scheduled, endangered and endemic species and the DNA laboratory facilities available at Headquarters and four Regional Centres viz, Northern Regional Centre, Dehradun; Western Regional Centre, Pune; Freshwater Biology Regional Centre, Hyderabad; Southern Regional Centre, Chennai are barcoding the species. During the current year 901 nucleotide sequences belonging to 333 species have been submitted to Barcode of Life Data System (BOLD) and nucleotide sequences at GenBank.



Museums play a crucial role for understanding the biodiversity and its value for conservation. Researchers and students to general public at large extent are beneficiaries of the natural history museums. The ZSI Headquarters as well as all Regional Centres are maintaining the Museum by exhibiting important faunal elements of the particular regions for the benefit of the large section of people. Visitors of the museum in Regional Centres were 5,00,527 persons as per the registered entries.

The knowledge obtained by the scientists of ZSI in different arena of zoological affairs is regularly being disseminated in the form of lectures, group discussions, training etc. On this line, 166 lectures have been delivered by the scientists for the benefit of students, researchers and academicians in various universities, colleges and schools during the year.

ZSI is also supporting the students to pursue Ph.D. degree through some of the Universities, in which several scientists registered themselves as recognized supervisors for guiding the students for doctoral research. Presently 55 students are enrolled for Ph.D. degree programme under the guideship of ZSI scientists. During the year 5 students have been awarded for Ph.D. degree while 3 students submitted their thesis.

Perhaps, the ZSI has one of the largest libraries in Asian region exclusively for zoological studies. The library facilities is opened for the utility of general public and 1748 persons benefited in the year by availing the facility. In order to further strengthen the library, 244 journals have been added at all the libraries of ZSI in Headquarters and Regional Centres.

ZSI being a National Institution, the laboratory facilities are extended to researchers for undertaking taxonomical studies. Hundred and fifty researchers availed the laboratories in Headquarters and Regional Centres for their studies.

In order to cope up with modern techniques on taxonomical and ecological studies, the ZSI is periodically updating its infrastructure facilities to meet a global standards. Accordingly during the year Microscopes, Projectors, Work Stations, Insect Storage Systems, Digital Camera with underwater housing, Water Quality Analyzer, Interactive Flat Panel display and GPS were added.

Being more than a century old organization mandated to undertake basic science, present days ZSI is gradually reoriented itself by implementing the scientific programme to address the ecosystem services rendered by biodiversity and to secure livelihood of the humans through effective conservation at this changing climate.

A person is lying down, possibly on a bed or grass, with their head resting on their hand. The image is heavily overlaid with a semi-transparent green filter. The person's face is partially visible, and they appear to be wearing a headband or similar accessory.

10

INTRODUCTION

The Zoological Survey of India is a premier institution established on 1st July 1916 to promote survey, exploration and research leading to the advancement in our knowledge of various aspects of exceptionally rich faunal resources of the erstwhile 'British Indian Empire'. The survey has its genesis in the establishment of the Zoological Section of the Indian Museum at Calcutta in 1875. This national institution is functioning under the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India. Over the years the scope of ZSI has been expanded based on the need of the country and is presently working on Conservation Areas; Status Survey of Endangered Species; Documentation of faunal resources in different ecosystems, bio-geographic zones, protected areas etc., Pollinators, Insect vectors, State Fauna, Digitization of faunal diversity, Mapping of faunal distribution in GIS platform, modern molecular tools for taxonomy and forensic sciences, Long-term monitoring of biodiversity to assess the impact of climate change, Palaeontological studies, Assessment of water pollution and abatement, Environmental Impact Assessment, Environmental Information System (ENVIS) on faunal diversity; Identification and advisory services; Designated National Repository of Types and voucher specimens; supporting enforcement of Wildlife (Protection) Act, 1972; CITES, Red data book, establishment of Marine aquaria and development of Museum for awareness on conservation of biodiversity etc. and acts as a custodian of the National Zoological Collections. The National Zoological Collections of ZSI comprise more than 5.8 million specimens belonging to as many as 60,000 species including about 10,000 species of our neighboring countries like Myanmar, Pakistan, Bangladesh and Sri Lanka.

PRIMARY OBJECTIVES

- Exploration, Survey, Inventorying and Monitoring of faunal diversity in various States, Ecosystems and Protected areas of India.
- Taxonomic studies of all faunal components collected.
- Periodic review of the Status of Threatened and Endemic species.
- Preparation of Red Data Book, Fauna of India and Fauna of States.
- Bioecological studies on selected important communities/ species.
- Maintenance & Development of National Zoological Collections.
- Training, Capacity Building and Human Resource Development.
- Faunal Identification, Advisory services and Library Services.
- Publication of results including Fauna of India and Fauna of States.



SECONDARY OBJECTIVES

- Environmental Impact Assessment Studies.
- Maintenance and Development of Museum at Headquarters and Regional Centres.
- Development of ENVIS and CITES Centres.
- Research Fellowship, Associateship and Emeritus Scientist Programmes.
- Collaborative research programmes on Biodiversity with other Organizations.
- GIS and Remote Sensing studies for animal diversity as well as for selected threatened species.
- DNA Barcoding of important taxa.

PRINCIPAL THRUST AREAS OF WORK

1. **Faunal Inventorization of States and Union Territories:** Inventory of different Faunal group on the following states and Union Territories were undertaken, viz. Andaman & Nicobar Islands, Lakshadweep Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chattishgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Meghalaya, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal.
2. **Faunal Inventorization of Ecosystems:** (1) Marine Ecosystem: East and West Coast of India, Digha Coast, Andaman and Nicobar Islands, Gulf of Mannar, Gulf of Kachchh, Lakshadweep, (2) Sunderbans : Bakkahali Island, Sagar Island. (3) Estuarine Ecosystem: Cauvery, Pennaru, Narmada-Tapti (4) Mangrove ecosystem: Odisha and Sunderbans (5) Freshwater Ecosystem: Chambal River, High altitude lakes and rivers, Bhoj, Govind Sagar, Chandratal, Riverine Ecosystems of Western Ghats (6) Himalayan Ecosystem, (7) Desert Ecosystem: Thar Desert, (8) Cold desert of Himachal Pradesh and Jammu Kashmir (9) Terai Grassland.
3. **Faunal Inventorization of Conservation Areas:** Gulf of Mannar Marine Biosphere Reserve, Satkosia, Baisipalli, Sundarbans, Sonamukhi, Betua-Dahuri, Talley Valley, Mehao, Bornadi, Nongkhylllem, Hazaribagh, Lawalong, Point Calimer, Saddle Peak, Malabar, Thattekkad Bird Sanctuary, Sultanpur Bird Sanctuary, Govind, Rajaji, Sonanadi, Valley of Flowers, Samaspur, Nauradehi, Koyna, Navegaon, Sariska, Govind, Kalatop Khajjiar , Thattekkad Bird Sanctuary etc.
4. **Status Survey of Threatened Species:** Coral reef, Himalayan Musk Deer, Crab eating macaque, Horseshoe crab, Swamp Deer, Hoolock Gibbon, Robber Crab, Nicobar Megapode, Black-necked Crane, Blue Sheep, Great Indian Bustard, Wild Ass, Hispid Hare etc.
5. **Taxonomic Studies:** Protozoa, Mollusca, Marine sponges, Echinodermata, Rotifera Trematoda, Nematodes, Marine Crabs, Hymenoptera, Termites, Lepidoptera, Coleopteran, Odonata, Collembola, Thysanura, Orthoptera, Hemiptera, Tettigonidae, Diptera, Oribatid Mites, Ixodid Ticks, Spiders, Fishes, Ephemeroptera, Oligochaeta, Fishes, Amphibia, Reptiles, Birds & Mammals.
6. **Maintenance of National Zoological Collections (NZC):** Preservation and Maintenance of NZC, holding more than 20,000 Type specimens.
7. **Advisory, Training and Extension Services:** Provided as and when sought by different Institutes/ Organizations and confiscated wildlife material for law enforcing authorities
8. **Computerization and Dissemination of Data:** Computerization of registered collection of Types and other specimens are being carried out along with digitization of the specimens. Interactive Identification and Information System, Primary Type Information Systems already initiated. Digitization of ZSI publication is freely available on website (www.zsi.nic.in)
9. **Collaborative Research Programmes/Projects.:** ZSI is involved in many collaborative research programmes with several Institutes and Universities across the country.
10. **Checklist of faunal groups:** More than 80 Checklist are available (zsi.gov.in).

ZSI HEADQUARTERS, KOLKATA

Headquarters of ZSI at Kolkata houses Scientific Divisions, Sections Library, Publication, Identification and Advisory, ENVIS centre, Field Survey, Training and Extension, Museum and Taxidermy Division, Photography Section, Artist Section, Scanning Electron Microscopy Unit and Data Centre. Besides, it also holds seven zoological galleries in Indian Museum.

The Scientific Divisions and Sections at ZSI Headquarters undertake studies on various animal groups from Protozoa to Mammals. The various sections of headquarters are:

SECTION PROTOZOOLOGY

01

Protozoology Section is mainly dealing with the studies on single celled, eukaryotic organisms, which are mostly microscopic and display enormous variability in shape, size and structure. The major contribution of this section includes the taxonomic account of 1500 species i.e., ~ 44% of the known Indian protozoan species is published from this section, including the description of 96 new species and 4 new genera. The total collection holding of this section is about 7824 specimens. The type collections include 321 slides of 109 species of free-living and parasitic protozoans. Among that about 1130 slides of ciliates, 153 of which are types slides representing 49 holotype and 104 paratype.

Presently the research of the section focuses on the Taxonomy and ecology of freelifing protozoans, particularly testate amoebae (Amoebozoa, Rhizaria) and Ciliates (Alveolata, Ciliophora).

SECTION PLATYHELMINTHES

02

Platyhelminthes section deals with Phylum Platyhelminthes or flatworms which include the planarians, flukes and tapeworms. Platyhelminthes section deals with the following groups of organisms: Trematode, Cestode and Monogenean parasites of Vertebrates and Acanthocephala. More than 34 programmes have been handled by the section and completed the database of 17 States and UTs. Altogether 87 Families of Platyhelminthes and Acanthocephala have been dealt till date. The section has total holdings comprising 21886 General Collections including 451 Type Collections. Presently the section is involved in 3 ongoing programmes on Trematodes of Fishes.

**SECTION
NEMATHELMINTHES****03**

Nemathelminthes section deals with the following groups of organisms: Soil-inhabiting nematodes comprising Bacterivorous, Fungivorous, Plant-Parasitic, Predatory, Omnivorous, Entomopathogenic nematodes and Helminth parasites of Vertebrates. More than 40 programmes have been handled by the section and completed the database of 22 States and UTs. The present holdings of the section include 24652 identified specimens and 7386 vials of unidentified wet collections. Besides, Type collections include 157 Slides and 249 specimens of wet collections.

**SECTION
CRUSTACEA****05**

The section holds Crustacean samples like Shrimps, Crabs, Hermit crabs, Woodlice and many Planktonic forms like Cladocerans, Copepods, Ostracods, etc. These specimens were collected from India and adjacent country during various period (from 1850 to till date). The specimens received from several countries across the world, specimens inherited from Asiatic Society of Bengal, Indian Museum and valuable types specimens are maintained. At present the Crustacea Division holds more than 98768 specimens of crustaceans including 6505 specimens of Types .

**SECTION
GENERAL
NON-CHORDATA****04**

General Non-Chordata section include studies on the groups that are associated fauna of Corals and coral reef habitat such as Porifera, Soft corals, Octocorals, Polychaetes, Echinodermata and Annelida and minor-phyta. The section houses 8,25,866 specimens which includes Porifera, Cnidaria, Annelida, Echinodermata and Minor-phyta. Among these, 1639 specimens are Type specimens

**SECTION
MOLLUSCA****06**

Many distinguished naturalists significantly contributed in documenting the molluscan fauna of Indian subcontinent in early years of eighteenth century and are proud members of the Malacology Division of Zoological Survey of India. Holdings of the section include 205220 specimens of which 1454 are Types . Mollusca Section deals mostly with the following group of organisms: Marine Gastropoda Bivalvia, Cephalopoda, Scaphopoda, Placophora and Aplacophora.; Freshwater Gastropoda and Bivalvia and Land Gastropoda/Land Snails. More than 50 research programmes have been published by the section and completed the database of 23 States and UTs. Presently, the section is involved in 10 ongoing programmes and five externally funded projects.

**SECTION
CENTRAL ENTOMOLOGY
LABORATORY****07**

CEL (Central Entomology Laboratory), The National repository of Insect Types, hosting types from all over the world. The section deals with the following groups of organisms: Formicidae, Thysanoptera, Phthiraptera, Hemiptera and Hymenoptera. The section holds different categories of Types belonging to 22 orders of insects like Diptera, Coleoptera, Lepidoptera, Hemiptera, Hymenoptera, Orthoptera, Mantodea, Phasmatodea, Thysanoptera, Dermaptera, Ephimeroptera, Odonata, Trichoptera, Neuroptera, Phthiraptera, Plecoptera, Thysanura, Dictyoptera, Embioptera, Siphonoptera, Strepsiptera and Psocoptera.

The section has total holdings comprising 28111 specimens of which 24493 specimens are identified and 3618 specimens are unidentified. The section also has total holdings of Type collections which consist of 13584 specimens of 22 insect orders. Presently the section is involved in ongoing programme on Studies on Formicidae (Hymenoptera) of Buxa Tiger Reserve and Mahananda Wildlife Sanctuary.

**SECTION
ISOPTERA****08**

Isoptera Section deals with the taxonomy of termites. More than 22 programmes have been handled by the section and completed the database of 16 States, UTs and conservation areas. Around 6 families of termites have been dealt till date. The section has a total of 3701 vials of termite specimens, of which 3159 are identified. The section has total holdings comprising 62497 specimens of General Collections and 1059 specimens of Type Collections. Presently the section is involved in 6 ongoing programmes on Termites.

**SECTION
LEPIDOPTERA****09**

Lepidoptera Section is involved primarily in collection, preservation, identification, cataloguing/ computerization, digitization and documentation of Lepidoptera (moths and butterflies) fauna of our country. The section holds 93577 specimens of which 38950 are named specimens and rest 54627 are unnamed specimens. Type specimens of Lepidoptera are deposited in Central Entomological Laboratory of ZSI, Kolkata.

**SECTION
HYMENOPTERA****10**

Hymenoptera section is dealing with pollinator, parasitic and predatory groups of Hymenopterans. Presently the section is involved in four programmes. The section has total holding comprising 40532 specimens out of which 21226 specimens are identified.

**SECTION
COLEOPTERA****11**

The Coleoptera section came into existence in 1927. The beetle section has privilege of prestigious collections made by renowned foreign scientists i.e. S. W. Kemp, S. L. Hora, N. Annandale, F. H. Gravely, Edward & Arangua, J. Wood Mason, E. Heutiaux, H. J. Pruthi, B.N. Chopra, Lord Carmichael, Fleutiaux, M. L. Roonwal, Atkinson, T. G. Vazirani, Canadian Department of Agriculture since the inception of the section. The section include holding of the beetles i.e. 3,07,807 specimens. The section has presently 1096 Type species along with more than 50,000 identified registered specimens. Currently the section is involved in the studies of the beetle fauna for the states of West Bengal, Maharashtra, Himachal Pradesh, Punjab, Arunachal Pradesh and Sikkim.

**SECTION
MISCELLANEOUS
INSECT
ORDER (MIO)****12**

The MIO Section holds both dry and wet collections belonging to insect orders like Odonata, Trichoptera, Neuroptera, Ephemeroptera, Psocoptera, Embioptera and Dermaptera and comes to a total of 485 species under 205 genera of 63 families. Some very old collections are from outside India, including countries like, Burma, Germany, Canada, USA, USSR, Croatia, Indonesia, etc. The section has a total of 12989 specimens, of which 10,832 are identified.

**SECTION
ORTHOPTERA****14**

Orthoptera Section deals with following group of Organism: Orthoptera, Blattodea, Mantodea, Phasmida and Dermaptera. The section has holdings of 30985 specimens of which 27254 are named specimens. Type specimens of Orthoptera are deposited in Central Entomological Laboratory of ZSI, Kolkata. More than 40 programmes have been handled by the section and completed the database of 25 States and UTs. Presently the section is involved in 7 ongoing programmes on Orthoptera.

**SECTION
APTERYGOTA****13**

The Apterygota are most primitive, wingless hexapods usually found in moist places such as soil, forest leaf litter, humus, under stones, caves, in ant and termite nests. More than 30 programmes have been handled by the section and completed the database of 11 States and UTs. Five groups- like Collembola, Protura, Diplura, Microcoryphia and Zygentoma have been worked out. More than 200 research publications including Pictorial handbook of Collembola & Thysanura, and revisionary studies of Collembola was published.

Presently the section is involved in 5 ongoing programmes. The section has a holdings of 35,445 specimens of Apterygota of which 19,561 specimens are identified and 15,884 specimens are unidentified. Type Collection include 809 specimens belonging 95 species.

**SECTION
HEMIPTERA****15**

Hemiptera Section has a holding of 145465 specimens (identified-47334) of terrestrial, semi aquatic and aquatic bugs. Fauna of India-Aphididae (8 vols.) are the major achievements of the section apart from some other major contributions like, A Check-list of the Scale Insects and Mealybugs of South Asia, A review of Indian coccids, Assassin bugs (Reduviidae: Heteroptera) from Chhattisgarh, India, Handbook on Major Hemipteran Predators of India, Catalogue of Reduviidae of India. At present, the section is involved in several programmes, including six ongoing combined programmes

**SECTION
DIPTERA****16**

With the legacy of more than 56 years Diptera section (estd:1962) is currently carrying out research in both classical and applied field of taxonomy. Diptera section deals with the following groups of organisms:

Diptera of Vector importance, predatory group pollinating efficiency, forensic importance and some other groups of economically important Diptera.

More than 80 programmes have been handled by the section and completed the database of 13 States and UTs. 87 Families of Diptera have been dealt till date. The section has a total holdings comprising a National Zoological Collection of 96,197 specimens, which includes 94,666 specimens in General Collections and 1531 samples in Type Collections. The total number of dipteran Type material deposited in CEL is 1531, which has been digitized also. Presently the section is involved in 4 ongoing programmes on Diptera.

**SECTION
ACAROLOGY****17**

The section deals with the following groups of organisms: Soil mites, plant mites, parasitic mites, water mites and Ticks. 35 programmes have been handled by the section and completed the database of 17 States and 2UTs. More than 18 families of plant mites, 95 families of soil mites, 08 families of parasitic mites and 01 family of water mite and 03 families of ticks have been dealt till date. The section has a total holdings comprising 12,705 General Collections and 416 Type Collections. Presently the section is involved in 05 ongoing programmes on soil mites

**SECTION
ARACHNIDA****18**

Arachnida Section deals with the following groups of organisms: Spiders (Order: Araneae), Scorpions (Order: Scorpiones), Pseudoscorpions (Order: Pseudoscorpiones), Whip Scorpions (Order: Thelyphonida), Opiliones (Order: Opiliones), Sun spiders (Order: Solifugae), Sea Spider (Class: Pycnogonida), Centipedes (Class: Chilopoda) and Millipedes (Class: Diplopoda). 15 programmes have been handled by the section and completed the database of 19 states and UTs. Forty one families of spiders have been dealt till date. The section has a total holding comprising of 34,997 general collections and 2580 examples of Type collections. Presently the section is involved in 2 ongoing programmes.

**SECTION
MARINE FISH****19**

Marine Fish Section has a holding of 489,509 (approximately) identified and 708 unidentified collections. In addition, there are 1008 Type materials of 429 species. The section is involved in 8 ongoing programmes.

**SECTION
FRESHWATER FISH****20**

The freshwater fish section of the Zoological Survey of India, Kolkata is the largest repository for freshwater fishes in the country hosting 3.3 lakh specimens including 1249 Type specimens. It includes century-old collection made by the Asiatic Society of Bengal which was later handed over to Zoological Survey of India. Collections made by the eminent scientists/researchers of the country and abroad are being maintained in the section.

**SECTION
AMPHIBIA****21**

At present, the section is involved in several programs on Anurans (frogs and toads), caecilians and the Himalayan salamander in the Eastern Himalayas, Eastern Ghats and the mangrove coastal areas. Thirty programs have been handled by the section and have completed the databases of all the States of north-eastern and northern India except Nagaland and Jammu, Kashmir and Ladakh. 14 families of Indian amphibians belonging to all 3 orders have been dealt till date comprising of 169 species. The present holdings of the section include 34659 identified specimens and 542 unidentified wet collection specimens. Besides, the section also possesses 143 specimens from other countries and 326 Type specimens.

**SECTION
BIRD****23**

The bird section includes 50,000 specimens of around 600 species of birds. All collections have been made from within and outside protected areas from not only India but also from various neighbouring countries and others. Of which 43259 specimens have been identified up to species level and the remaining are being identified on monthly basis. The most significant aspect of collections in bird section is of Type specimens collected over a period of more than 200 years. In birds section 504 Type specimens of birds are being preserved.

**SECTION
REPTILIA****22**

Reptilia section deals with the following groups of organisms:

Order 1. Loricata (Crocodiles), Order 2. Testudines (Turtles and Tortoise), Order 3. Squamata Suborder: Sauria (Lizards), Suborder: Serpentes (Snakes).

25 programmes have been handled by the section and completed the database of 17 States and 2 UTs. 15 Families of Reptiles have been dealt till date.

The section has a total holding comprising 33,653 General Collections and 524 Type collections. Three groups and 15 families were worked out till date. Presently the section is involved in 2 ongoing programmes on Reptiles.

**SECTION
MAMMAL & OSTEOLOGY****24**

The Mammal & Osteology section holds 29,121 dry and wet specimens of various mammalian species besides 300 Type collections. There are three galleries, namely Zoological gallery, Osteological gallery and Wet collection cum Osteological galleries and are open for researchers, students, academicians and public as well. Presently the section is involved in two ongoing programmes on Mammals of Gorumara National Park, Chapramari Wildlife Sanctuary and Mahananda Wildlife Sanctuary, North Bengal.

SECTION PALEOZOLOGY: INVERTEBRATE AND VERTEBRATE

25

Palaeozoology Division of ZSI is the repository of the immense important collection of excavated prehistoric faunal remains from Indian subcontinent. Till date ZSI worked on specimens from about fifty archaeological sites and custodian of the prehistoric animal remains excavated by mostly the Archaeological Survey of India, also Directorate of State Archaeology, universities and individuals (chance findings) and other institutions from about thirty seven different prehistoric sites of the Indian subcontinent. In the holdings of Prehistoric Zoology Section there are collections from Harappa (early phase excavation, Hastinapur, Rangpur, Ujjain, Burzahom, Kausambi, Taxilla, Tilaurkot & Kodan (Nepal), Susunia, Andaman and many other important sites. Prehistoric zoology section also have a great collection of modern comparative collection of different domestic as well as wild species which is very important for the study of animal remains. Vertebrate and Invertebrate Palaeozoology sections were added afterwards for research in palaeontology with the vertebrate and invertebrate fossils collection from different fossil bearing sites of India like Siwalik, Trichirapalli, Rajasthan, Gujarat, Northeast India and others.

SECTION WILDLIFE & CONSERVATION

26

The section deals with wildlife ecology specially population and habitat ecology for the conservation and management of wildlife species. A number of research projects the section is implementing largely focused on population assessment, habitat ecology in different landscape of the country. The section has implemented several projects in the past and currently implementing demand driven and action projects in Indian Himalayan Region, Gangetic plains and Chotta Nagpur plateau and Southern Bengal region. The section is also organizing training to different stakeholders for enhancing the capacity with respect to wildlife monitoring.

At present the section is involved in two annual programmes.

SECTION ECOLOGY

27

Ecology section was formed on 9th June 2017 by merging two sections, i.e. Animal Behavior and Animal Population. This section deals with ecological work and also the taxonomy of the fauna related to the ecological work. Till date, 701 examples of earthworms and 396 nematode specimens have been identified and registered (Earthworms registered in the General Nonchordata Section and Nematodes are registered in the Nemathelminthes Section). All the specimens are also digitized for RFD. Along with these, 126 earthworm specimens have been identified as Advisory services.

**SECTION
SOIL ZOOLOGY****28**

Soil Zoology section includes microscopic protozoans to macroscopic mammals. Many projects were handled on mammals, mollusca, insects, mites, earthworms and protozoans. The identified specimens reported were deposited in sections respective to the group of fauna. At present the collection holdings of 883 microslides of protozoans mainly on amoebzoa and cercozoa of protozoas are present in the section. Presently the section is involved in six ongoing programmes.

**SECTION
DNA AND MOLECULAR
SYSTEMATICS LABORATORY****29**

The Centre for DNA Taxonomy (CDT) under Molecular Systematics Division (MSD) was established in 2011 at the Zoological Survey of India (ZSI), Kolkata along with four regional centers (WRC, Pune; NRC, Dehradun; FBRC, Hyderabad; and SRC, Chennai) to generate DNA barcode sequences of Indian fauna. As of now, the CDT, MSD has generated more than 6000 DNA barcode data of various animal taxa, especially the threatened, indicator, ecologically and economically important taxa. The generated DNA barcode data has contributed greatly to the global databases (GenBank and BOLD) to accelerate the systematics and evolutionary research. CDT and MSD trying to resolve and answer specific questions cryptic speciation, phylogenetics, evolutionary relationships, and wildlife forensics etc. Several externally funded projects funded by the Department of Science and Technology (DST), Department of Biotechnology (DBT), Council of Scientific and Industrial Research (CSIR), Indian Council of Agricultural Research (ICAR), Ministry of Environment Forests and Climate Change (MoEFCC) are ongoing/competed. Comparative Mitogenomics, Environmental Metagenomics, Gut Microbiome, Metasystematics, Wildlife Forensics, and Population Genetics are some of the current thrust areas of the Centre.

**SECTION
MUSEUM & TAXIDERMY****30**

Museum and Taxidermy maintains the seven Zoological galleries in Indian Museum Kolkata. Along with the Museum exhibits, it has Reserve and Loan collections in the Taxidermy Section. Five programmes have been handled by the section and completed the database of 3 States. The section has a total holding comprising 2674 General Collections and one Type Collection (Whole skeleton of Common Minke Whale) display in the Mammal Gallery of Indian Museum. Mammals, Birds and Insects groups were worked out till date. Presently the section is involved in one ongoing programme ie Faunal diversity of Neora Valley National Park, West Bengal.

REGIONAL CENTRES OF ZSI

ZSI has 16 Regional Centres spread all over the Country for the exploration and documentation of fauna in different jurisdiction.

NORTH EASTERN REGIONAL CENTRE (NERC), SHILLONG

01

The North Eastern Regional Centre, Shillong is the first of the 16 Regional Centres of Zoological Survey of India and was established on 6th March, 1959 with the primary objective of exploring and documenting the faunal diversity of northeastern region of India. The Centre's jurisdiction extends over six North East Indian states of Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. The North-East India biogeographic zone covering these six states constitutes about 5.2 percent of the total geographic area of the country. This region is situated in the transition zone of Palearctic and Indomalayan biogeographic realm and also constitutes parts of Indo-Burma biodiversity hotspots. The Northeastern India is also hypothesized as the gateway of past faunal influx from South East Asia to mainland India. Thus, this region exhibit extraordinary opulence of life forms with high level of species endemism. The Centre is engaged in documenting the myriad diversity of animal life forms in this biologically rich region. Till date, 124 research programmes covering various aspects of faunal diversity in the Northeastern states were completed by the Centre. At present, the Centre is involved in four research programmes in the states of Meghalaya and Mizoram. The Centre maintains a museum exhibiting the faunal wealth of the northeastern region and also holds a collection of about 96000 identified specimens and over 160000 unidentified specimens from various faunal groups.

02

WESTERN REGIONAL CENTRE (WRC), PUNE

The Western Regional Centre at Pune, Maharashtra was set up in September 1959 under the Second Five Year Plan of the Government of India and now completes 60 years (1959-2019). The primary objective being exploration and documentation of the Indian Peninsula, which is a complex natural unit of geomorphological and biogeographical evolution. This centre has completed various programmes to mention a few viz. Fauna of India: Scorpiones and Araneae; State fauna: Maharashtra, Goa; Wildlife Sanctuaries: Bhimashankar, Lonar, Phansad, Radhanagari, Koyna; National Park: Chandoli, Pench, Navegaon, Sanjay Gandhi; Tiger Reserve: Melghat, Tadoba-Andhari; Ecosystem: Nathsagar, Ujani, Northern Western Ghats; Status survey: Western Tragopan, Indian Edible Nest Swiftlet. Currently, two programmes on Wildlife Sanctuary: Yawal and Gautala-Autramghat are ongoing. Over 85 new species of various faunal groups (Decapoda, Araneae, Fishes, Amphibians, Scorpiones, Diptera, Rodentia, Cypriniformes, Ephemeroptera, Hymenoptera, etc.) have been described by the scientists of the centre. This centre holds a rich collection of various faunal groups and total holdings of this centre is 1,91,389 with 85139 named and 106250 unnamed specimens. Besides, WRC has well equipped modern DNA Barcoding laboratory and generated 20 DNA barcodes. WRC is a training centre for GSDP and successfully conducted training on various courses viz. Foundation Course (Biodiversity Conservationists); Advanced Course (Parataxonomists); Parataxonomy including People's Biodiversity Register programmes under the governments highly ambitious project 'skilled India' sponsored by MoEF&CC.

CENTRAL ZONE REGIONAL CENTRE (CZRC), JABALPUR

03

Central Zone Regional Centre of Zoological Survey of India was established at Jabalpur on 24th February 1960 under Second Five Year Plan, to survey and document our knowledge of the faunal resources of Central India. The Centre covers two states of Central India namely Madhya Pradesh, (covering 51 Districts having 09 National Parks, 25 Wildlife Sanctuaries, 05 Tiger Reserves and 01 Biosphere Reserve) and Chhattisgarh (covering 27 Districts with 03 National Parks, 13 Wildlife Sanctuaries and 01 Tiger Reserve and 01 Biosphere Reserve shared with M.P.). This regional centre lies at 23°11'22.01"N Latitude and 79°54'50.31"E Longitude. In the National Zoological Collection of this centre, a total of 1,39,976 numbers of holdings are catalogued comprising 74246 identified and 65730 unidentified specimens. This regional centre has completed 40 Research Programmes involving faunal exploration in various Protected and non-protected Areas of Madhya Pradesh and Chhattisgarh along with studies on behavior, taxonomic revisions and State Fauna Series of Madhya Pradesh and Chhattisgarh. Currently, there are three ongoing research programmes. Although there is no official collaboration with any University for taking up PhD programmes, the scientists of this centre are affiliated to Rani Durgavati Vishwavidyalaya, Jabalpur M.P.

DESERT REGIONAL CENTRE (DRC), JODHPUR.

04

The Desert Regional Centre of the Zoological Survey of India, Jodhpur was established in June, 1960 in the name of Desert and Gangetic Plains Regional Station under Second Five Year Plan to survey the faunal diversity of Desert Biome. Later, in 1965 due to the characteristic changes in its boundaries, it was renamed as at present. The Jurisdiction of the Centre is spread over 3, 42,239 Sq. km. area of Rajasthan and 1,81,1000 Sq. km. of Gujarat, covering 33 Districts each of Rajasthan and Gujarat state. The area encompasses 7 National Parks and 48 Wildlife Sanctuaries, 3 Tiger Reserves, 3 Ramsar Sites and 13 Conservation Reserves. The Centre is engaged in the documentation of the rich and diverse faunal resources of the Rajasthan and Gujarat state by conducting field explorations and scientific studies. Total holdings of the Centre include 468630 specimens with 70632 Identified specimens and 397998 Unidentified specimens. Types include 68 specimens.

NORTHERN REGIONAL CENTRE (NRC), DEHRADUN

05

Northern Regional Centre located at Dehradun, is one of the prestigious centres of ZSI. It was established in August 1960 under the second five year plan of the Government of India. Over the decades it is working to fulfill its mandate to explore and document the fauna of four north Indian states namely Uttarakhand, Uttar Pradesh, Punjab and Haryana, including union territories i.e. Chandigarh and Delhi NCR, covering an area of c. 441707 km². The region comprises of ecologically diverse areas ranging from the western Himalaya in north with Shivalik ranges at the base, through Gangetic Plains with Terai in north and Bundelkhand in south, and the part of the Aravalli in southwest with equally diverse biodiversity in its one World Heritage Site (Nanda Devi), one Biosphere Reserve (Nanda Devi), 3 Tiger Reserves (Corbett, Dudhwa and Rajaji), 9 National Parks, 57 Wildlife Sanctuaries, 10 Conservation Reserves and 60 Important Bird Areas. During last few years, the centre has adopted the modern approaches in the field of taxonomy and faunal exploration, and well-equipped modern labs and faunal repositories with state of art facilities for investigations in taxonomy, systematics and faunal documentation have been established. The Northern Regional Centre is known for its expertise in the field of Avian Studies, Entomo-fauna, Molecular Taxonomy, Tricho-taxonomy, Nematology and Bio-acoustic studies. The centre holds a rich collection of various faunal groups. Total holdings of the centre include 409277 (Identified specimens: 215166; Unidentified specimens : 194111) specimens and 772 Type specimens. So far, three GSDP courses have been completed, successfully. First course was three months' foundation course, and it was followed by three months' advance courses.

06

SOUTHERN REGIONAL CENTRE (SRC), CHENNAI

Southern Regional Centre was established during the II Five Year Plan on 9th March 1961 to conduct faunal explorations within its jurisdiction. Area under Jurisdiction: Tamil Nadu (30 districts with five National Parks, fourteen Wildlife Sanctuaries, four Tiger Reserve), Karnataka (Eight districts of southern part with four National Parks and ten Wildlife Sanctuaries), Southern part of Andhra Pradesh, Union Territory of Puduchery (Pondichery). Three Biosphere Reserves fall within the jurisdiction of the Centre.

GANGETIC PLAINS REGIONAL CENTRE (GPRC), PATNA

07

Gangetic Plains Regional Centre was set up at Patna in March 1965 under Third Five Year Plan to survey, ascertain and augment knowledge on the faunal resources of Gangetic Plains area under jurisdiction: The jurisdiction of the Centre is spread over two states Bihar having 38 Districts with one National Park, eleven Wildlife Sanctuaries and one Tiger Reserve and Jharkhand having 24 Districts with one National Park, ten Wildlife Sanctuaries and one Tiger Reserve. During the last 54 years of its existence this centre has shown all round development such as research, field surveys, and development of the National Zoological Collections, Museum, Green Skill Development Program and construction of its own office building. The centre has completed more than 40 programmes under Fauna of States, Fauna of Ecosystem, Status Survey, Ecological studies and revisionary studies. Total holding include 144442 specimens, comprising 10498 named specimens and 133944 unnamed specimens. Apart from this 12 Type specimens are housed in the centre.

HIGH ALTITUDE REGIONAL CENTRE (HARC), SOLAN

08

High Altitude Regional Centre was established in September 1968, under the Fourth Five Year Plan of the Government of India, with the main objective of exploring the Himalayan fauna. The jurisdiction of the centre includes the mountainous state of Himachal Pradesh, Union Territories Jammu & Kashmir and Ladakh of the North Western Himalaya. They are located between 30° 22' 40" N - 37° 06' N latitudes and between 72° 30' 20" E - 79° 04' 20" E longitudes and spread over an area of 2, 77, 909 sq.km. Owing to vast altitudinal variation from 600m to 6,500m asl, it covers all the four physiographical zones of the Himalaya viz. Shiwalik, Lesser, Great and Trans Himalaya. Three important ranges, Karakoram Range is the northern most range, to the south of the Karakoram ranges run the Zaskar range and parallel to Zaskar ranges lie the Pir Panjal ranges in the region. The state Himachal Pradesh and two Union territories i.e. Jammu & Kashmir and Ladakh falling in its jurisdiction includes 09 National Parks, 43 Wildlife Sanctuaries, 37 Conservation Reserves, One Biosphere Reserve and 07 Ramsar sites. There are a total of 32,759 specimens of identified collection and 1,66, 259 specimens of unidentified collection present in the laboratories of the centre. Presently there are two ongoing programmes being handled by the Centre viz. "Faunal Diversity of State of Jammu & Kashmir" and "Faunal Diversity of Temperate and Alpine grasslands of Himalaya (Phase-1): Himachal Pradesh". University of Jammu has been recognized as a research institute for Ph.D programme at ZSI.

09

MARINE BIOLOGY REGIONAL CENTRE (MBRC), CHENNAI

Marine Biology Regional Centre was established on March 1, 1973, in Chennai, from where it was a Marine Survey Unit of Zoological Survey of India, Kolkata, since its inception under the first five-year plan in April 1959. Established with the mandate to studying the Marine Biodiversity of India, this centre was commissioned to assessing the biodiversity in marine ecosystems within the 2.02 million sq km EEZ of India - from reef types such as fringing, barrier and atolls, to seagrasses, mangroves, estuaries, sand dunes, salt marshes and extensive beaches in addition to the oceanic habitats, submerged reefs and mounts. From the time of inception of this centre in Chennai, 108 projects have been completed by the scientists under the Annual Programmes of Research and a few externally funded projects. Currently the centre has 8 ongoing programmes of which 3 are externally funded. This centre is a recognized centre for Ph.D. studies under the Madras University and currently has 4 students enrolled for their PhD. The centre holds a total of 1, 26, 314 specimens of National Zoological Collections of which 1, 13, 104 specimens are named. The species represented in the collections are 2,713 numbers.

ANDAMAN AND NICOBAR REGIONAL CENTRE (ANRC), PORT BLAIR

10

Andaman and Nicobar Regional Centre of Zoological Survey of India was established at Port Blair on 21st April 1977 with the jurisdiction covering Andaman and Nicobar Islands and its coastal and off-shore waters. Since its inception, 77 research programmes have been completed on several faunal groups of this archipelago. The major areas of studies at this Centre are on Taxonomy, Ecology and Zoogeography of Protozoan to Mammalia from marine and terrestrial ecosystems. Scientists of the ZSI, Port Blair published 72 books, and over 750 research papers in various peer reviewed national and international journals, 60 pamphlets, 40 general articles and 70 posters. At present there are 17 ongoing projects including 09 in-house projects and 08 grant-in-aid projects handled by scientists of this Centre in marine and terrestrial ecosystems of these Islands. Coral reefs and their associated faunal communities are given special attention.

Para-taxonomist including PBR of Green Skill Development Programme (GSDP) of MoEFCC completed successfully during 23rd July 2018 - 31st January 2019. This Centre holds 50371 identified specimens under the 'National Zoological Collection', of which 3500 are displayed in its Museum for the viewing of researchers, students and general public. More than 3500 visitors from mainland as well as foreigners witnessed regional museum of the Centre during this reporting period.

SUNDERBAN REGIONAL CENTRE, (SBRC), CANNING

11

The Sunderban Regional Centre was established in the year 1979 at Kakdwip, West Bengal under the Fifth Five Year Plan of the Government of India. This centre was established with an objective to survey the faunal wealth of Sunderban as it is closely entangled with waterways like rivers, creeks, estuaries and marine. In the year 1984, in order to have a better focus on Sunderban Biosphere Reserve, the centre was shifted from Kakdwip to Canning. In the year 2010, SBRC planned to establish more facilities for the office for better scientific and administrative management, and from January 2012 onwards the office was shifted to a new building at No 1 Dhigirpar, Canning Town. The total holdings of this Centre is 52566 specimens which includes 8858 identified specimens and 43708 unidentified specimens.

12

FRESHWATER BIOLOGY REGIONAL CENTRE (FBRC), HYDERABAD

Freshwater Biology Regional Centre was established under Fifth Five -Year Plan of Govt. of India on 24th February 1979 at Hyderabad, Telangana State (erstwhile united Andhra Pradesh) in contemplation to study the limnological aspects of the freshwater bodies throughout India focusing on exploration and documentation of physico-chemical, ecological profiles and faunal diversity of the all the freshwater ecosystems including wetlands of National and International (Ramsar sites) importance. The Center has holdings of freshwater faunal collections from various wetlands. The Center is one of the 16th faunal repositories of National Faunal Collections under the National Biological Diversity Act and has holdings of over 18442 unidentified specimens and 36670 identified specimens. The Centre is well equipped with facilities like modern analytical instruments for carrying out research in limnoecological, hydrobiological, faunistic studies and animal DNA Barcoding. The Centre contributed a total of 298 barcode sequences of 183 species to NCBI and BOLD. The centre has published 18 books and more than 200 research papers in various reputed journals. The Centre also is recognised by Osmania University, Hyderabad for pursuing Ph.D in Zoology. Many research scholars have registered for doctoral research at FBRC,ZSI, Hyderabad.

WESTERN GHATS REGIONAL CENTRE (WGRC), CALICUT

13

The Western Ghats Regional Centre at Calicut, Kerala, established in April 1980, under the Sixth Five Year Plan of the Government of India, is one among the sixteen Regional Centres of the Zoological Survey of India. The jurisdictional limit of the Centre encompasses the entire biogeographical zone of the Western Ghats, an extremely important life supporting system of Peninsular India. The Centre is engaged in the documentation of the rich and diverse faunal components/ resources of the Western Ghats and Kerala, by conducting field explorations and scientific studies. Behavioral study of non-human primates of Western Ghats, Faunal resources of Eravikulam National Park, Kerala,, Faunal resources of Bhadra Tiger Reserve, and Kudremukh National Park, Karnataka, Taxonomic revision of Pteromalinae (Pteromalidae: Chalcidoidea: Hymenoptera) of Indian Sub-continent, Faunal Atlas of Odonata (Insecta) of the Western Ghats, Faunal Atlas of Amphibians of the Western Ghats, Systematic studies on Pteromalidae (Hymenoptera: Insecta) of Southern Western Ghats, Faunal resources of Malabar Wildlife Sanctuary, Kerala, Systematic studies on Scelioninae (Hymenoptera: Insecta) of South Western Ghats Interactive identification and information system of the Indian genera of Diaprinae (Insecta: Hymenoptera: Diapriidae), Fauna of Thattekkad Bird Sanctuary, Kerala, Survey and documentation of faunal resources of Shola grasslands of Western Ghats-Phase-I, Fauna of Tropical Rainforests- Western Ghats, Kerala, Fauna of Freshwater ecosystem: Sasthamkotta Lake, Kerala and Fauna of Kerala are the major research programmes undertaken by the centre. Fauna of Agasthyamalai Biosphere Reserve (Joint programme with SRC ZSI, Chennai, Chennai) Fauna of Lakshadweep Islands (Joint programme with ZSI Kolkata) and Fauna of India: Family Vespidae (Insecta: Hymenoptera) are the research programmes currently ongoing in the centre. The NZCs maintained in the centre contain 38,906 named and 1,07,918 unnamed specimens. The collection also includes more than 637 Holotypes and 619 Paratypes. The centre is recognized as a Research Centre for conducting research leading to Ph. D. degree of the University of Calicut.

ESTUARINE BIOLOGY REGIONAL CENTRE (EBRC), GOPALPUR ON SEA

14

Estuarine Biology Regional Centre, Gopalpur-on-sea, Ganjam was established in 1980 during the Sixth Five Year Plan of Govt of India. The Primary objective of this centre is to conduct investigations on faunal diversity of estuaries, backwaters, lagoons and mangrove ecosystem along the east and west coast of India. Geographical coverage include estuaries and mangrove ecosystem of India which are extended throughout the country along both east and west coasts, the jurisdiction of the Estuarine Biology Centre is "All India" covering all estuaries and associated mangrove ecosystem of the country. Total holdings of the Centre include 71537 specimens, of which 45962 are named and 25575 are unnamed specimens and 18 Type specimens.

15

ARUNACHAL PRADESH REGIONAL CENTRE (APRC), ITANAGAR

Arunachal Pradesh Regional Centre of the Zoological Survey of India was established on 31st January 1983, at Itanagar under the Seventh Five Year Plan, mainly to augment and explore the knowledge on faunal wealth of Arunachal Pradesh. The Area under Jurisdiction includes, Arunachal Pradesh, a northeastern state with an area of 83,743 sq. km having total protected area of approximately 12, 000 sq. km. comprising of thirteen Wildlife Sanctuaries, two National Parks, one Orchid Sanctuary, three Tiger Reserves, 8 Community Reserves, 2 Elephant Reserves and one Biosphere Reserve. Being in the ecotone of the two regions, due to edge effect, the state possess biotic elements from both the regions as well as have its exclusive components and thus represents Indo-Chinese, Indo-Malayan, Indo-Burmese and India biotic components. This has earned the state the distinction of one of the main corridor for eastern entrant of the Indian sub-region. That is why it is also referred as an active centre of organic evolution. Holdings of the Centre include 37221 specimens of which 10603 specimens are named and 26618 are unnamed.

MARINE AQUARIUM AND REGIONAL CENTRE (MARC), DIGHA

16

Marine Aquarium and Regional Centre was established on 1st July, 1989. The centre has two distinct wings viz. research centre and aquarium, in addition to facilities for mass education to people. The research wing of the centre started functioning in 1989; however, the aquarium was opened for public since 2003. It was set up with the objectives of conducting education and awareness programme through the marine aquarium which is an integral part of MARC and providing infrastructure facility for conducting professional training course on coastal and marine ecosystem. The holdings in the centre include 24,676 specimens, 6687 named and 17,989 unnamed specimens. The collection also includes more than 48 Type specimens.

Q2

**RESEARCH
PROGRAMMES
HEADQUARTERS**

Research programmes of ZSI covers primitive organisms belonging to Kingdom Protista to the highly evolved Mammalia of the Kingdom Animalia, inhabiting different Ecosystems, Protected Areas, States & UTs, Biogeographic zones as well as Conservation and status of Threatened species. Besides taxonomic studies and ecology, latest techniques in Lifesciences like Metagenomics, Forensics and GIS applications are also studied by the scientists of both HQ and Regional Centres of ZSI. During this financial year, ZSI, HQ was involved in 45 In-house programmes, of which 12 were completed, 24 were ongoing and 9 programmes were initiated.

HEADQUARTERS

01

Diversity and Distribution
of Cephalopods along the
East Coast of India



Spineless Cuttlefish,
Sepiella inermis
(Van Hasselt, 1835)

Investigators:	Dr. Basudev. Tripathy & Shri. A. K. Mukhopadhyay
Period:	April 2015 to March 2018
Status:	Completed
Objectives:	To document the diversity and distribution of Cephalopods along the East Coast of India

Outcome:
The study recorded 64 species of Cephalopoda under 24 genera, 14 families, 4 orders and 2 subclasses, of these, 32 species of Cephalopods are recorded from East Coast of India of which one species *Euroteuthis bengalensis* is endemic to Bay of Bengal. Order Nautilida is represented by single family Nautilidae and genus *Nautilus* represented by one species *Nautilus pompilus* recorded from Andaman and Nicobar Islands and from east coast of India. Order Sepiida, represented by four families, six genera and 15 species, of which, 9 has been recorded from East Coast. Order Teuthida, represented by five families, eight genera and 18 species, out of which 11 species recorded from East coast of India. Order Octopoda, represented by four families, nine genera and 30 species, of which 11 species recorded from East coast of India.

Fauna of Marine Mollusca
of West Coast of India w.r.t.
Gujarat and Maharashtra

02

Investigators:	Dr. Basudev Tripathy & Shri. A. K. Mukhopadhyay
Period:	April 2015 to March 2018
Status:	Completed
Objectives:	To document the marine Mollusca from Gujarat and Maharashtra

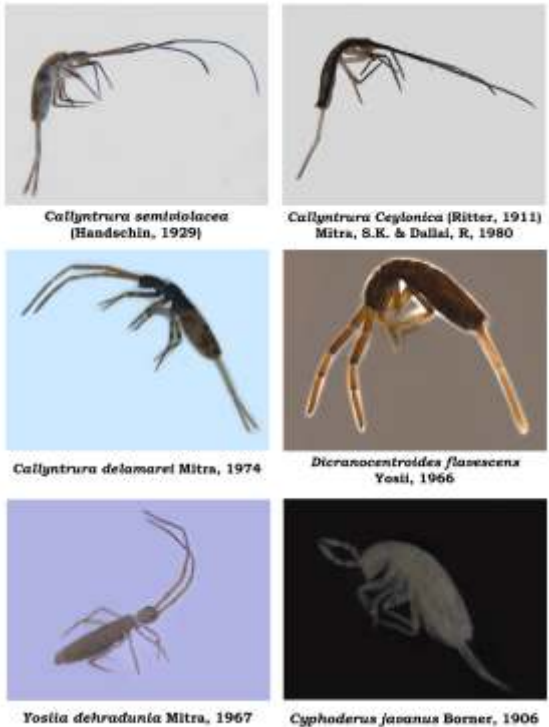
Outcome:
Total number of species of Polyplacophora and Gastropoda occurring in Maharashtra is 346, belonging to 146 genera and 67 families. Class Polyplacophora is represented by three species under two genera and two families. Class Gastropoda represented by 343 species under 143 genera and 65 families. Out of which 24 species reported first time from the state. Bivalvia is represented by 146 of species, besides scaphopods from Maharashtra also reported. Total number of species of Polyplacophora and Gastropoda recorded from Gujarat is 579, belonging to 345 genera and 104 families, of which 18 species recorded from literature only.

Beach at Mandvi, Bhuj in Gujarat during low tide



03

Collembolan Fauna
of Duars Region of
Northern West Bengal &
Shola Grassland
of Western Ghats



Investigators:	Dr. G.P.Mandal & Shri K. K.Suman
Period:	April 2016 to March 2018
Status:	Completed
Objectives:	To study the Collembolan Fauna of Duars Region of Northern West Bengal and Shola Grassland of Western Ghats.

Outcome:
 Altogether 45 species was recorded from Duars Region of Northern West Bengal and Shola Grassland of Western Ghats, Kerala, while from Duars Region of Northern West Bengal, 16 species under 11 genera and 5 families were found. Thirty species of Collembola belonging to 11 genera under 8 families have been recorded from Shola grassland of Kerala, of which 19 species are endemic to Kerala. One new species, *Lepidocyrtoides malabaricus* Mandal *et.al.*, 2019 described from Shola grassland of Western Ghats.

04

Diversity and
zoogeographical
distribution of freshwater
fishes of North Bengal

Investigators:	Shri Amitabha Das Shri K.C. Gopi & Shri S.S. Mishra
Period	April 2016 to March 2018
Status:	Completed
Objectives:	To study the diversity and zoogeographical distribution of freshwater fishes of North Bengal.

Outcome:
 The study recorded 223 species of freshwater fishes belonging to 72 genera, 41 families and 16 orders from the rivers of North Bengal. Seven species viz., *Setipinna brevifilis* (Valenciennes), *Labeo angra* (Hamilton), *Piaractus brachypomus* (Cuvier), *Bagarius yarrelli* (Sykes), *Eutriplichthys goongwaree* (Sykes), *Batasio spilurus* Ng, and *Oreochromis mossambicus* (Peters) were collected for first time from North Bengal.

Jhalong River, North Bengal



05

Exploration of the
Hamilton's species from
the Ganga-Brahmaputra
drainage

Investigators:	Shri K.C. Gopi & Shri S.S.Mishra
Period:	April 2011 to March 2019
Status:	Completed
Objective:	To study the freshwater fishes of Ganga-Brahnaputra drainage.

Outcome:
A list of 260 species described by Hamilton (1822) is provided with current status. Of which 177 species found to be valid.

Significant findings:
In all 51 topotypes collected. Two species, i.e., *Pethia conchonius* and *Pethia ticto* have been redescribed.

06

Fauna of
Eastern Ghats: Reptilia

Investigator:	Dr. Varadaraju
Period:	April 2016 to March 2018
Status:	Completed
Objective:	To study the Reptilian fauna of Eastern Ghats.

Outcome:
The present study provides information for the first time on 70 species of Reptiles belonging to 3 orders under 16 families and 47 genera from Eastern Ghats. Among these, family Colubridae represented highest diversity with 20 species, followed by Gekkonidae with 11 species, Scincidae with 7 species, Agamidae with 6 species, Trionychidae with 3 species, Viperidae with 3 species, Lacertidae, Geoemydidae, Typhlopidae, Uropeltidae and Boidae with 2 species each. Crocodylidae, Testudinidae, Chamaeleonidae, Varanidae, Pythonidae and Homolopsidae with single species each. Some rare species were also encountered like *Varanus bengalensis*, *Geochelone elegans* and *Lissemys punctata*.

Skinks of India - a
taxonomic study

07

Investigators:	Dr Kaushik Deuti, Shri Probhat Bag & Shri Sujoy Raha
Period:	April 2010 to March 2018
Status:	Completed
Objectives:	To visit different museums in India viz. ZSI Reginal Centres, BNHS, IISc, SACON and document the skink specimens, and study their detailed taxonomy. To revise the taxonomic status of Indian skinks.

Outcome:
The study reports re-descriptions, cataloguing, illustrations, diagrams, maps and physical verification of 59 skink species from India by documenting 3136 specimens in ZSI, HQ and all 16 regional stations as well as some other renowned museums such as Bombay Natural History Society, Indian Institute of Science, Salim Ali Center for Ornithology and Natural History, Madras Government Museum and Wildlife Institute of India.

Avian Fauna of West
Coast of India-Gujarat
and Maharashtra

08

Investigator:	Debdulal Saha
Period:	April 2010 to March 2018
Status:	Completed
Objectives:	To study the avian fauna of West Coast of India - Gujarat and Maharashtra

Outcome:
The study recorded the avian fauna from 12 coastal districts of Gujarat and Maharashtra including two Bird Sanctuaries: Khijadia Bird Sanctuary in Jamnagar district of Gujarat and Karnala Bird Sanctuary in Raigarh district of Maharastra. 204 species of birds under 59 families have been reported out of which one species is Endangered, 15 species are Near Threatened and 2 species are Vulnerable.

09

Fauna of Satkosia-
Baisipally Wildlife
Sanctuary, Odisha

Coordinators:	Dr. Dhriti Banerjee & Dr. G. P. Mandal
Investigators:	Subject experts from ZSI HQ
Period:	April 2015 to March 2018
Status:	Completed
Objectives:	To identify and inventorise the fauna from various ecosystems of the Satkosia and Baisipally Wildlife Sanctuary, Odisha.

Outcome:

An attempt was made to bridge the gap of faunal research, through extensive faunistic surveys and documentation of Satkosia Tiger Reserve. This study reveals that biological diversity (including protistan diversity, floral diversity and faunal diversity) of this protected area is pretty high comprising 1.41% of India's total faunal wealth. Though Satkosia constitute only 0.0006% of India's total geographic protected area network (PAN) it still has a very high index of faunal dominance. The result includes 1219 species over 301 families, which includes 858 species under 542 genera over 169 families of invertebrates and 361 species under 155 genera over 133 families of vertebrates. Four species has been described as new to science, 3 species has been found as Endemic to India whereas 249 species as new record to state of Odisha whereas 17 species have been found as new record from India.

Satkosia Landscape



10

Status Survey of Swamp
Deer or Barasingha,
Rucervus duvaucelii (G.
Cuvier, 1823) (Cervidae;
Cetartiodactyla:
Mammalia) in India



Swamp Deer, *Rucervus duvaucelii* (G. Cuvier, 1823)

Investigator:	Dr. Gaurav Sharma
Period:	April 2015 to March 2018
Status:	Completed
Objectives:	To survey and assess the status of Swamp Deer or Barasingha, <i>Rucervus duvaucelii</i> (G. Cuvier, 1823) (Cervidae; Cetartiodactyla: Mammalia) in India.

Outcome:

Surveys were conducted to understand the distribution status of Swamp deer in Uttar Pradesh, Assam and Madhya Pradesh. Surveys were conducted to 28 different localities of Dudhwa National Park (DNP), 21 localities in Kanha National Park (KNP), MP and 8 different localities in Kaziranga National Park, Assam between month of March and December 2015 and 2017. A total of 318 individuals (126 Adults and 192 subadults/immature) were recorded in 2015- 2016 and 501 individuals of Swamp Deer/Barasingha (144 Adults and 357 subadults/immature) during the survey period 2016-17 in KNP, MP. In Kaziranga a total 304 individuals (78 adults and 226 subadults/immature) in 2015-2016. In DNP 494 individuals of Swamp Deer were observed during 2015-16 (110 adults and 384 subadults/immature) and 201 individuals (74 adults and 127 subadults/immature) were observed during 2016-17.

11

Fauna of Terai
Grasslands of
Gangetic Plains

Coordinator:	Dr. G. Maheswaran
Investigators:	Subject experts from ZSI HQ
Period:	April 2016 to March 2019
Status:	Completed
Objectives:	To identify and inventorise the fauna from various ecosystems of Terai Grasslands of Gangetic Plains.

Outcome:

Three field surveys were conducted. First in Jaldapara National Park, North Bengal. 93 bird species were recorded. One Black necked stork (Juv.) were spotted beside other important bird species such as Lesser Adjutant, Grey Nightjar and Great Hornbill were sighted. Second in Dudhwa NP, Uttar Pradesh. 135 bird species were recorded and 25 mammal species were also recorded. Significant bird species such as Black necked Stork, Great Hornbill, Red Jungle Fowl, Swamp Francolin were recorded. Third in Valmiki Tiger Reserve, Bihar. 85 species of birds were sighted and 14 mammal species. Total number of species reported by different groups include : 1234 species with 5 species new to sceince and 192 new distributional records.

Indian Hog Deer, *Hyelaphus porcinus* (Zimmermann, 1780)



12

Investigating Thrips
Diversity (Thysanoptera:
Insecta) in Rajasthan
State of India

Investigator:	Dr. Vikas Kumar
Period:	April 2014 to March 2017
Status:	Completed
Objectives:	To mitigate the gap information of the Rajasthan thrips faunal diversity through an integrated approach of morphological and molecular tools.

Outcome:

Surveys were conducted in different districts of Rajasthan and 60 species in 41 genera were identified from the collected material (35 new records to the state, one new record to India and three new to science) including one new family and one subfamily from the state. Further, 232 DNA barcode data were generated from 52 species and submitted to the BOLD database under the Project "DNA barcoding of Thrips from India". The slide mounted specimens were labelled with distribution details, host plant and registration numbers and deposited at National Zoological Collections (NZC), at Zoological Survey of India, Kolkata.

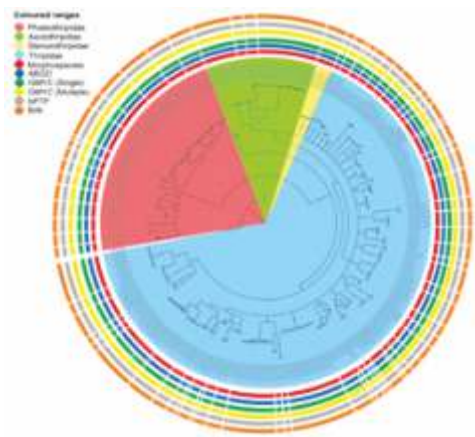


Figure: Bayesian inference gene tree with delineated MOTUs with posterior probability of the studied thrips species. The study includes four families: Phlaeothripidae, Thripidae, Stenurothripidae and Aeolothripidae were highlighted by colour corresponding to the clade. Color bars indicate delineated MOTUs by different methods; Morphospecies, ABGD, GMYC (Single and Multiple), BIN, and bPTP.

13

Fauna of Eastern Himalaya- Arunachal Pradesh-Coleoptera

Investigators:	Dr. Devanshu Gupta, Dr. O.P. Srivastava, Mrs. Abha Sar, Mr. S. K. Ghosh & Mr. R. K. Kushwaha
Period:	April 2016 to March 2018
Status:	Ongoing
Objective:	Taxonomic study of Coleoptera: Families Scarabaeidae, Staphylinidae, Dytiscidae, Gyrinidae, Haliplidae, Noteridae and Carabidae.

Progress:
Total 1,370 specimens were examined which resulted with 227 species belonging to 118 genera under 9 families. A checklist containing 1,014 species of beetles under 54 families from Arunachal Pradesh, Eastern Himalaya prepared based on a literature review and collection.

14

Efficacy of DNA barcoding in identification of Platygastroidea (Hymenoptera) from India

Investigators:	Dr. Rajmohana K Dr. Vikas Kumar & Dr. Kaumod Tyagi
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To find the efficacy of DNA barcoding in identification of Platygastroidea (Hymenoptera) from India.

Progress:
PCR of 59 specimens under 21 species completed. Morphology based identification of 25 species of Platygastroidea completed.

15

Taxonomic study of Eels of the order Anguilliformes of the east coast of India

Investigators:	Dr. A. Mohapatra, Shri. S. S. Mishra & Shri. P. C. Tudu
Period:	April 2015 to March 2018
Status:	Ongoing
Objective:	To study the Eels of the order Anguilliformes of the east coast of India

Progress:
Two new species, *Gymnothorax odishi* sp. nov. and *Ophichthus johnmccoskeri* sp. nov. have been described. Four species, viz., *Ophichthus machidai*, *Allips concolor*, *Gymnothorax zonipectis* and *Diploconger polystigmatus*, recorded for the first time from India. *Ophichthus chilensis* has been redescribed and resurrected. Two morphs of *Bascanichthys deraniyagalai* reported and the species redescribed.

16

Morphological and Molecular study of Mulletts (Mugiliformes: Mugilidae) of India

Investigators:	Shri. S. S. Mishra & Dr. Vikas Kumar
Period:	April 2014 to March 2018
Status:	Ongoing
Objectives:	To study the morphology and molecular characterization of Mulletts of India.

Progress:
A total of 22 DNA sequences obtained. Identification aid for the family Mugilidae prepared in the light of new findings which will impact reallocation of some species in other genera.

17

Studies on the cardinal
Fishes (Perciformes:
Apogionidae) of West
Coast of India

Investigator:	Shri. S. S. Mishra
Period:	April 2014 to March 2017
Status:	Ongoing
Objective:	To study the cardinal fishes of West Coast of India.

Progress:
29 species of cardinal fishes from east coast of India and 20 species from west coast of India recorded. Key to genera and species prepared for easy identification of all species.

18

DNA Barcoding studies
on *Holotrichia* complex.
(Scarabaeidae: Coleoptera)
on sugarcane crops from
North and Central India

Investigators:	Dr. Kailash Chandra Dr. Vikas Kumar & Dr. Devanshu Gupta
Period:	April 2016 to March 2019
Status:	Ongoing
Objectives:	DNA Barcoding studies on <i>Holotrichia</i> complex (Scarabaeidae: Coleoptera) on sugarcane crops from North and Central India

Progress:
One survey was undertaken to Uttar Pradesh. More than 252 specimens collected and morphologically identified. DNA isolation and PCR of 60 specimens have been done. 60 sequences have been generated so far, which revealed multiple cryptic species in *Holotrichia longipennis*. The barcodes have been uploaded in BOLD.

19

Studies on the Faunal
Diversity of Urban lakes
of Kolkata

Investigators:	Dr. K. Valarmathi, Dr. P. G. Sethy & Shri. Santanu Mitra
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To study the faunal diversity of Urban lakes of Kolkata.

Progress:
Surveys conducted to East Kolkata Wetlands, Subash Sarovar, Patuli Water Park, Mydan Tank, Wetlands in Dhapa, Rabindra Sarobar, various water bodies. In Bariupur, Santhragatchi Jheel and nearby water bodies, Mudiali Nature Park, Taratala and Nalban berry at Nalban food park, Captain Bherry, Devighat, Nalban 1,2, Bamanghatta, Kulberia, Dharamtala Pachuria, Jagatipota, Mukundapur, Panchasayar, Shantipark, East Kolkata Wetlands Goltala, Bantala etc., Faunal samples collected comprise 2143 specimens including Ants, Hemeiptera, Crustacea, Earthworms, Coleoptera, Leeches, Mollusca and several other insect groups. Observations were made on reptiles, birds, and mammals.

20

Validation of Chiropteran
Species present in the
National Zoological
Collections (NZC)

Investigators:	Dr. C. Venkatraman & Dr. M. Kamalakanan
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To validate Chiropteran species present in the National Zoological Collections (NZC).

Progress:
Altogether 5739 specimens of bats belonging to 117 species of 8 families were sorted out. A total of 53 tuft of dorsal guard hair samples under 20 species were collected for the tricho-taxonomy study. Four bat species such as Durga Das's Leaf-nosed Bat, Greater Long-tongued Fruit Bat, Least leaf-nosed Bat and Schneider's leaf-nosed bat were found to have extended its distribution range to other parts of India.

21

Zooarchaeology of Faunal remains of Kalibangan, Rajasthan – An Indus Valley site

Investigator:	Mrs. Supriya Nandy
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To study the Zooarchaeology of Faunal remains of Kalibangan, Rajasthan - An Indus Valley site.

Progress:
The animal remains specimens from Kalibangan site are being sorted out and arranged. Identified 11 species of Mammalia, one species of Aves and two species of Reptilia.

22

Status Surveys of Hispid Hare

Investigator:	Dr. G. Maheswaran
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To ascertain the stauts of Hispid Hare

Progress:
Survey was conducted in Jaldapara National Park (West Bengal) and Dudhwa National Park (Uttar Pradesh). Fresh pellets of Hispid hare were sighted and collected for DNA analysis. Animal was photographed in Camera Traps.

Survey team



Status Survey of Brown Bear in Western Himalayas

23



Brown bear, *Ursus arctos* Linnaeus, 1758

Investigators:	Dr. Lalit Kumar Sharma, Dr. Mukesh Thakur & Dr. C. Venkatraman
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To assess the status of brown bear in Western Himalayas.

Progress:.
A field survey was conducted in Tindi, Udaipur ranges of the Lahaul Forest Division during 14th Sep 2018 to 27th Sep 2018. The study area was systematically searched by following standard methods for field sampling. A total of 5 trails of about 10km average distance was walked in the study areas. The effort resulted in n= 49 scat samples, n= 37 other indirect evidences and one direct sighting. During the study time, camera traps were also installed. A total of 6 camera traps were installed and monitored for five nights, hence, an effort of 30 trap nights was made in the study area which resulted in seven camera captures of Himalayan brown bear. The analysis related to abundance, capture rates and occupancy will be carried out once the data on presence and absence for the entire Western Himalayan Region will be collected.

24

Fauna of Chilika
Lake, Odisha

Coordinator:	Dr. Basudev Tripathy
Investigators:	Subject experts from ZSI HQ and Regional Centres
Period:	April 2016 to March 2019
Status:	Ongoing
Objectives:	To study and inventorise the fauna of Chilika lake, Odisha.

Progress:

Two combined surveys were conducted by the sections of Mollusca, Platyhelminthes, Nematelminthes and CEL. Protozoa: 35 species (256 specimens) of testate amoebae were identified, including one new record to India, *Lamptopyxis callistoma* Bonnet, 1974. Platyhelminthes: 133 specimens of trematodes in 20 vials collected. 107 specimens were identified belonging to 13 species. Nematoda: Identification includes 374 specimens belonging to 45 species. All 45 species are first records from Chilka. Crustacea: 1232 specimens were identified belonging to 40 species. Mollusca: 2047 specimens were identified belonging to 151 species. Collembola: 14 species were identified, including, one new genus and species of Collembola- *Falcomurus chilikaensis* Mandal, 2018. Acari: 18 species were identified of which, 4 species are new records to India. Besides 2 genera are reported first time from India. CEL: Identified 29 species of Formicidae. Soil Zoology: 17 species identified comprising 2 species of testate amoebae, 2 species of ciliophora, 5 species of copepoda, 4 species of rotifer and 4 species of cladocera. Marine Fishes: Total 1176 specimens collected from all survey period have been identified as belonging to 162 species, of them, 25 species is new locality records from the ecosystem.

View of Nalban Island



Faunal diversity of
Ganga (Gangotri to
Gangasagar)

25



View of Ganga River near Harsil

Coordinator:	Dr. Lalit Kumar Sharma
Investigators:	Subject experts at ZSI HQ/ NRC/ GPRC
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To assess the faunal diversity of Ganga from Gangotri to Gangasagar

Progress:

So far two surveys have been conducted in Upper section of Ganga river and about 550km stretch of Ganga river was covered with respect to faunal diversity assessment. The team collected 83 specimens of fishes.

Progress report of GPRC

1746 specimens of faunal groups (Insects, Pelecypoda and Gastropoda, 16 vials of zooplankton) were collected whereas, 64 species of avian fauna were observed in the field.

26

Fauna of Buxa Tiger Reserve, West Bengal

Coordinator:	Dr. S. I. Kazmi & Dr. A. Ramesh Kumar
Investigators:	Subject experts
Period:	April 2017 to March 2020
Status:	Ongoing
Objectives:	To explore and inventorize the fauna of Buxa Tiger Reserve.

Progress:

Four Combined surveys were conducted by different sections. **Protozoa:** Nine species (90 specimens) of free living ciliates were identified, including 2 ciliates new records to Indian fauna. **Platyhelminthes:** 74 specimens of trematodes were collected, of which identified 66 specimens belonging to 18 species. Nine species of trematodes were recorded for the first time from West Bengal. **Nematoda:** 24 soil samples were collected. Identification include 136 specimens belonging to 21 species. **Mollusca:** Identified 225 specimens belonging to 11 species, The significant finding was land snails belonging to Family Ariophantidaethe was dominant in the forest landscape. **Hymenoptera:** Collected 1740 specimens. Sorted 862 specimens into 15 families and identified 31 species. **Orthoptera:** Collected 96 specimens of Orthoptera and identified into 44 species. **Hemiptera:** Collected 1303 specimens of terrestrial and aquatic Hemiptera and identified 37 species. **Lepidoptera:** 252 specimens of Lepidoptera were collected and identified 46 species. **Soil zoology:** Identified 79 specimens belonging to 18 species.

Hymenoptera collected from Buxa Tiger Reserve



Morphological and molecular systematics of Thysanoptera of Odisha & Gujarat

Investigators:	Dr. Kaomud Tyagi & Dr. Vikas Kumar
Period:	April 2017 to March 2020
Status:	Ongoing
Objectives:	Morphological and molecular systematics of Thysanoptera of Odisha & Gujarat.

Progress:

One survey conducted in Gujarat. A total of 60 species have been identified and barcoded, which revealed a number of cryptic species in at least five thrips species. More than 550 specimens collected. 20 species were recorded for the first time from the State.

DNA Barcoding of Vertebrate Fauna present in National Zoological Collection (NZC) of ZSI w.s.r. to Primates

Investigators:	Dr. Mukesh Thakur Dr. C. Venkatraman & Dr. Vikas Kumar
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	DNA Barcoding of Vertebrate Fauna present in National Zoological Collection (NZC) of ZSI w.s.r. to Primates.

Progress:

In total, 50 barcodes belonging to 40 ATP6 genes and 10 Cytb genes of Mammals were generated.

27

28

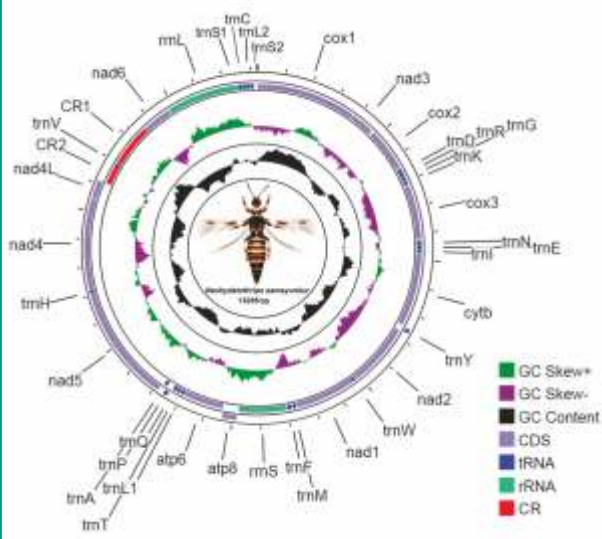
29

ZSI-National Faunal Genome Resources (ZSI-NAGR):Sequencing Fifty Animals Mitogenomes-Phase-I

Investigators:	Dr. Kailash Chandra & Dr. Vikas Kumar
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	ZSI-National Faunal Genome Resources (ZSI-NAGR): Sequencing Fifty Animals Mitogenomes-Phase-I

Progress:

Complete Mitochondrial Genomes have been sequenced and analysed, comprising 6 species of Thrips, one species of Spider and two species of Turtles.



The Mitochondrial genome of *Neohydatotherps samayunkur* (Kudo, 1995)

30

Fauna of Mahananda Wildlife Sanctuary, West Bengal

Coordinator:	Dr. Shelley Acharya
Investigators:	Subject experts from ZSI HQ
Period:	April 2017 to March 2020
Status:	Ongoing
Objectives:	To explore and inventorize the fauna from Mahananda Wildlife Sanctuary, West Bengal.

Progress:

Four combined surveys were conducted by different sections. **Protozoa:** Identified 90 specimens belonging to 12 species of Ciliates with 4 species as new record to India. Two flagellates were also identified.

Platyhelminthes: 93 specimens of trematodes were collected, of which 50 specimens belonging to 17 species identified. 8 species have been found to be first record from West Bengal. **Nematodes:** 40 soil samples were collected for the study of Nematodes. Identified 79 specimens belonging to 29 species. **Hymenoptera:** 269 specimens of Hymenoptera collected belonging to 15 families and identified 24 species. **Orthoptera:** Collected 424 specimens of Orthopteran and identified 320 specimens belonging to 43 species. **Hemiptera:** Collected 362 specimens of terrestrial and aquatic Hemiptera and identified 18 species.

Lepidoptera: Collected 203 specimens of Lepidoptera and identified 29 species of moths and butterflies. **Acari:** Collected 79 packets of soil samples; identified 278 specimens of soil mites belonging to 30 species. **Arachnida:** Collected 813 specimens of spiders and Identified 95 specimens into 23 species. **Mollusca:** Identified 356 specimens belonging 21 species. The significant finding was that edible and economically important species (*Bortia costula*, *Paludomus blanfordiana* and *Filopaludina bengalensis*) were recorded. **Ecology Section:** Collected 170 specimens of earthworms and identified 9 species. **Soil Zoology:** 27 specimens belonging 11 species of protozoa were identified.

31

Fauna of Daman, Diu, Dadra & Nagar Haveli

Coordinators:	Dr. Rajmohana. K & Dr. G. P. Mandal
Investigators:	Subject experts from ZSI, HQ & WRC
Period:	April 2017 to March 2020
Status:	Ongoing
Objectives:	To identify and inventorise the fauna of Daman, Diu, Dadra & Nagar Haveli.

Progress:
Nematoda: Identified 135 specimens belonging to 20 species. **Isoptera:** Collected 690 specimens and identified 617 specimens belonging to 16 species. **Lepidoptera:** 24 species were identified. **Collembola:** Collected 1275 specimens and identified 16 species. **Orthoptera:** 178 specimens belonging to 30 species were identified. **Hemiptera:** Identified 19 species. **Soil Zoology:** Identified 31 specimens belonging to 11 species of rhizopoda.

Landscape view of Diu



Fauna of Assam

32



Episyrphus (Episyrphus) balteatus (De geer, 1776)

Coordinator:	Dr. Dhriti Banerjee
Investigators:	Subject experts from ZSI, HQ
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To identify and inventorize the fauna of Assam.

Progress:
One survey was undertaken to Jorhat, Dibrugarh and Majuli districts.
Collected 37 samples for soil Nematodes and 42 specimens belonging to 12 species identified. In addition, 1841 specimens of Collembola were collected and identified 14 species; 1090 specimens of Diptera were collected. Altogether 20 families have been sorted. The most abundant flies among order Diptera is Sepsidae (21.28%) followed by Sarcophagidae (15.13%) and Syrphidae (14.49%). The family Ulididae (0.18%) and Drosophilidae (0.003%) are the least abundant flies collected during the survey period. Among the other fauna collected, the Coleoptera was most abundant group followed by Hymenoptera and Lepidoptera. The Odonata was the least abundant group.

33

Fauna of Neora
Valley National Park,
West Bengal

Coordinator:	Dr. P. G. S. Sethy
Investigators:	Subject experts from ZSI,HQ
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	Inventorisation of fauna of Neora Valley National Park.

Progress:

Four combined surveys were conducted by the Amphibia, Reptilia Lepidoptera, Diptera, Protozoology, Apterygota, Crustacea, Orthoptera and MIO Sections. 10 species of Amphibia identified from Neora Valley NP, of which 4 are recorded for the first time from the National Park. 10 specimens of fishes were collected. 2 species of crabs, 2 species of Prawns were collected and identified. Four species of leeches and one species of Earthworm were identified. 368 specimens of Diptera were identified into 155 species. 622 specimens of Collembola, 3 of Diplura and 31 of symphyla were collected and are under identification.705 specimens of Lepidoptera are under identification. 51 specimens of Protozoa were identified belonging to 14 species. Besides, 2193 specimens of insects (Hemiptera, Coleoptera, Hymenoptera,Orthoptera, Lepidoptera, Diptera, Trichoptera, Plecoptera) were also collected and are under identification.

Amolops marmoratus (Blyth)



Macroceroea grandis (Gray, 1832)

Fauna of Gorumara
National Park and
Chapramari Wildlife
Sanctuary, West Bengal

34

Coordinators:	Dr. M. E. Hassan & Mrs. R. Goswami
Investigators:	Subject experts from ZSI,HQ
Period:	April 2017 to March 2020
Status:	Ongoing
Objectives:	To identify the fauna of Gorumara National Park and Chapramari Wildlife Sanctuary.

Progress:

Three surveys were conducted by different sections **Mollusca**: collected 425 specimens, of which 210 specimens identified belonging to 16 species. The significant highlight was Mollusca belonging to the family Thiaridae had the maximum species composition in freshwater, whereas family Ariophantidae was dominant land snails recorded from the PAs. **Isoptera**: 300 specimens collected and identified 146 specimens belonging to 6 species. **Orthoptera**: 158 specimens were collected and identified belonging to 41 species. **Hemiptera**: Collected 419 specimens of terrestrial and aquatic Hemiptera and identified 44 species. **Lepidoptera**: 219 specimens collected and identified 32 species of moths and butterflies. **Acari**: Collected 79 packets of soil samples, identified 278 specimens of soil mites with 30 species. **Earthworms**: 211 specimens were collected and identified 10 species. **Soil Zoology**: 24 water, 32 soil and 38 moss samples collected, 37 specimens identified into 14 species. **Mammal & Osteology section**: Checklist of 36 mammals belonging to 8 orders were prepared based on the literature.

35

Fauna of Lakshadweep

Coordinators:	Dr. Anjum N. Rizvi, Dr P.M. Sureshan & Dr Rajkumar Rajan
Investigators:	Subject experts from ZSI, HQ & WGRC
Period:	April 2017 to March 2020
Status:	Ongoing
Objectives:	To identify and inventorize the fauna of Lakshadweep with special reference to terrestrial fauna.

Progress:

One survey was undertaken to Kavaratti, Amini, Kadmat and Agatti Islands.

Total fauna collected: 1261 specimens belonging to 9 faunal groups. Of which 87 specimens belonging to 15 species of soil Nematodes, 37 specimens belonging to 14 species of Hemiptera, 985 specimens belonging to 10 species of Collembola, 6 specimens belonging to 4 species of Odonata, 38 specimens belonging to 5 species of Hymenoptera were identified. Besides 6 species of Lepidoptera, one species of Amphibia, 5 species of Reptilia, 41 species of Birds and one species of Mammals were observed.

36

Fauna of Lakshadweep Islands: Echinoderms

Investigators:	Dr. N. Marimuthu & Dr. Rajkumar Rajan
Period:	April 2017 to March 2020
Status:	Ongoing
Objectives:	To study and inventorize the Echinoderm fauna of Lakshadweep group of Islands.

Progress:

One survey was undertaken and 24 SCUBA dives logged for the collection during the survey period. 25 species of Echinoderms (147 specimens) have been identified. *Fromia pacifica* H.L. Clark, 1921 identified as new record to India.

37

Diversity and ecology of protozoan ciliates based on morphology and molecular analysis from the Ganga (Hooghly) river

Investigator:	Dr. Santosh Kumar
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To investigate the diversity of free living protozoan ciliates based on morphology and molecular analyses and their comparison with previous reports.

Progress:

One local survey conducted to Dakshineswar, Babughat , Budge Budge and Bata. 16 species (163 specimens) of free living ciliates were identified. 18S rRNA gene sequenced for the proposed new species.

38

Diversity of deep sea copepods from east coast of India-Bay of Bengal

Investigator:	Dr. Honey U. K. Pillai
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To explore and inventorize deep sea copepods from East coast of India-Bay of Bengal.

Progress:

Taxa wise analysis of 34 zooplankton samples completed. A total of 1056 specimens belonging to 54 planktonic copepod species were identified and recorded. In addition, species identification of deep sea tunicate *Pyrostremma spinosum* (Herdman, 1888) was carried out both morphologically and through molecular analysis (both COI and 18S rRNA methods). The gene sequence obtained with 18S rRNA forms the first report from the Indian Ocean and COI gene sequences forms first ever report in NCBI records.

39

Taxonomy and ecology of
Aedes mosquito Vectors
(Culicidae: Diptera) of
Dengue, Chikungunya
and Zika

Investigators:	Dr. D. S. Suman & Dr Vikash Kumar
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	Taxonomy and ecology of <i>Aedes</i> Mosquito vectors (Culicidae:Diptera) of Dengue, Chikungunya and Zika

Progress:
Surveys were conducted In three major sites and their surrounding areas namely Madurai, Kodaikanal and Anamalai. 39 habitats were searched for the mosquito larvae using ladle collection and adults with light traps and BG-sentinel traps. Larval habitats included river bads, reveries, ponds, ditches, tanks, containers, cisterns, pools and puddles. Although the season was dry during the survey and hot with highest temperature of 43 °C in Madurai and surrounding areas the Kodaikanal was coldest during with lowest 15 °C, however, Anamali forest reserve was optimum in weather conditions. From the survey, more than 1569 mosquitoes were collected from all the three locations which belong to 12 species of 5 species of *Culex* mosquitoes and 2 species of *Aedes*. The DNA of 10 species has been isolated for DNA barcoding and systematic evaluation..

40

Faunal inventORIZATION of
Bunning & Zeilad Wildlife
Sanctuaries, Manipur

Investigators:	Dr. L. Kosygin Singh & Dr. S.D. Gurumayum
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To study the fauna of Bunning & Zeilad Wildlife sanctuaries, Manipur.

Progress:
Two surveys conducted and collected 1030 specimens of fishes, of which 87 specimens identified into 7 species. Different faunal specimens along with 455 mollusca specimens were collected.

41

Fauna of Gahirmatha
Marine Sanctuary
in Odisha

Investigator:	Dr. Basudev Tripathy
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	To study the Fauna of Gahirmatha Marine Sanctuary in Odisha.

Progress:
One preliminary survey undertaken for faunal collections from Gahirmatha Marine Sanctuary in Odisha and 217 specimens of land, freshwater and marine Mollusca were collected belonging to 25 species.

42

Long term monitoring
of olive ridley sea turtles
along Odisha coast



Mass nesting of olive ridley turtles,
Lepidochelys olivacea (Eschscholtz, 1829)

Investigator:	Dr. Basudev Tripathy
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	Long term monitoring of olive ridley sea turtles along Odisha coast

Progress:
Towards long term monitoring of olive ridley sea turtles along Odisha coast, preliminary surveys were undertaken to the Rushikulya and Gahirmatha and offshore and population enumeration was done.

43

Faunal diversity of Coringa Wildlife Sanctuary, Andhra Pradesh



Mangrove trail in Coringa WLS

Coordinator:	Dr. C. Raghunathan
Investigators:	Dr. G. Maheswaran, Dr. Anil Mohapatra, Dr. S. Balakrishnan, Dr. J.S. Yogesh, Dr. C. R. Sreeraj, Dr. Karuthapandi, Shri. P.C. Tudu
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	To document the faunal diversity of Coringa Wildlife Sanctuary, Andhra Pradesh.

Progress:

Three surveys have been conducted which covered 58.01 sq km² area in marine mangrove, estuarine and mudflat ecosystems of Coringa WLS. Altogether 6225 specimens comprised of 2406 ex. of Mollusca, 2275 ex. of Insects, 185 ex. of Arthropoda, 53 ex. of Echinodermata, 45 ex. of Nudibranch, 56 ex. of Chordata, 30 ex. of Polychaete, 28 ex. of Flatworms, 17 ex. of Barnacles, 12 ex. of Shrimp, 18 ex. of Cnidaria, 4 ex. of Brachiopoda, 4 samples of Plankton, 1 ex. of Sea snake and 1091 examples of miscellaneous groups have been collected. A total of 484 species under Molluscs (201) fishes (100), Arthropods (19), Polyclad (1), Rotifers (13), Brachiopoda (1), Cnidarians (3), Mammals (2), Reptile (1), Aves (78) have been identified.

Fauna of Singalila National Park, West Bengal

44

Coordinator:	Dr Kaushik Deuti
Investigators:	Subject Experts from ZSI HQ
Period:	April 2018 to March 2020
Status:	Initiated
Objective:	To document the faunal diversity of Singhalila National Park

Progress:

Three surveys were undertaken. Altogether 1940 specimens belonging to Lepidoptera, Trichoptera, Neuroptera, Coleoptera, Diptera, Spiders, Orthoptera Hemiptera, Dermaptera, Chilopoda, Diplopoda and Mollusca were collected. Besides, soil, water and moss samples were collected for the study of Nematodes and Protozoans. 83 species of birds were sighted and about 60 species were photographed. The altitudinal distribution of the birds were noted. Sandakphu with coniferous forests at higher altitude harboured Red Crossbill, Gauribas at lower altitude had several species of Tits, Fulvettas and Laughing Thrushes in bamboo thickets. Tumling at mid-altitude had several species of Thrushes, Myzornis, Yuhinas and Sunbirds in the Rhododendron forests.

Fauna of Eastern Ghats

45

Coordinator:	Dr Swetapadma Dash
Investigators:	Subject Experts from ZSI HQ and Rcs
Period:	April 2018 to March 2020
Status:	Initiated
Objective:	To assess the faunal diversity of Eastern Ghats

Progress:

Two surveys were conducted to Araku, Khallikote, Paderu East, Tara Tarai, Pathapatnam, Chilka and Olsol. Collections include 2900 specimens belonging to Araneae, Coleoptera, Dermaptera, Isoptera, Hemiptera and Hymenoptera. Besides, soil, water and moss samples were collected for the study of protozoans. Identification includes 33 species of butterflies, 57 species of moths and 10 species of testate amoebae.

03

**RESEARCH
PROGRAMMES
REGIONAL
CENTRES**

ANNUAL REPORT 2018-19

The sixteen Regional Centres of ZSI are spread across the county. These Regional Centres handled 81 research programmes during the period under report. Among them 26 completed programmes, 26 ongoing programmes and 29 programmes were initiated during the year.

NORTH
EASTERN
REGIONAL
CENTRE
(NERC),
SHILLONG

Faunal inventory of
Nongkhyllem Wildlife
Sanctuary, Meghalaya

01

Investigators:

Smt. I.J. Kharkongor, Dr. U. Saikia,
Dr. Dimos Khyntiam,
Shri. A. B. Meetei, Sh. A. Rana &
Shri. B.Saikia

Period:

April 2015 to March 2018

Status:

Completed

Objective:

To document the species diversity of
various faunal groups in
Nongkhyllem Wildlife Sanctuary,
Meghalaya.

Outcome:

Nongkhyllem Wildlife Sanctuary covering an area of about 29 sq. km. is one of the four Wildlife Sanctuaries of Meghalaya and considered as one of the last remaining Tropical mixed evergreen forests in the State. Because of the relatively pristine nature of the forest, the Sanctuary apparently holds a wide variety of fauna. Faunistic surveys were conducted and collected 1219 specimens of various faunal groups These specimens were identified in to 176 species under 133 genera and 68 families as follows: Mammalia-13 species, Reptilia-13 species, Amphibia-17 species, Pisces-19 species, Mollusca-12 species, Crustacea-10 species, Lepidoptera-71 species and Hemiptera-21 species.

Herennia ornatissima Doleschall, 1859



02

Faunal Inventory of
Bornadi Wildlife
Sanctuary, Assam



Hylarana tytleri Theodold, 1868

Investigators:	Smt. I.J. Kharkongor, Dr. U. Saikia, Dr. Dimos Khynriam, Shri. A. B. Meetei, Shri. A. Rana & Shri. B.Saikia
Period:	April 2015 to March 2018
Status:	Completed
Objective:	To document the species diversity of various faunal groups in the Sanctuary.

Outcome:

Situated in the foothills of Himalaya in Baksa and Udalguri districts of Assam, the Bornadi WLS encompasses an area of 26.22 sq km and is well known for the occurrence of species like Hispid hare and Pygmy hog. Two surveys were conducted and collected 964 specimens of various fauna. They were identified in to 84 (total 103 species including identification based and other evidences) species as follows: Mammalia: 5 species (24 species in total including sightings and secondary evidences), Reptilia: 5 species, Amphibia: 5 species, Pisces: 19 species, Mollusca:11 species, Crustacea: 5 species, Lepidoptera: 30 species and Aquatic Hemiptera: 4 species.

03

Resurvey of Siju Cave
along with Krem Labit
and Umlawan,
Meghalaya
(Cave Ecosystem)

Investigators:	Officer-in-Charge and Scientists of NERC
Period:	April 2017 to March 2020
Status:	Ongoing
Objectives:	To record any changes in faunal diversity in recent times based on earlier faunal documentation

Progress:

Two surveys were conducted and 1153 specimens were collected. Identification include 5 species of Fishes, 4 species of Reptiles, 7 species of Mollusca and 3 species of Chiroptera.

Faunal Inventory of
Murlen National Park,
Mizoram

04

Investigators:	Smt. I. J. Kharkongor, Dr. U. Saikia, Dr. D. Khynriam, Shri. A. B. Meetei, Shri. A. Rana, & Shri. B. Saikia
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To document the species diversity and status of various faunal groups in the National Park

Progress:

Two surveys were conducted. A total of 913 Identification were collected from these surveys. Identifiaction include: 4 species of Amphibia, 6 species of Reptilia and 6 species of Mammalia.

05

Status Survey of
Raorchestes shillongensis
(Pillai & Chanda, 1973)
(Amphibia: Anura:
Rhacophoridae) - a
Critically Endangered
Frog Endemic to
Meghalaya, NE India

Investigators:	Smt. I. J. Kharkongor & Shri. B. Saikia
Period:	April 2018 to March 2019
Status:	Initiated
Objective:	To determine the current status of Critically Endangered and endemic frog <i>Raorchestes shillongensis</i> in Meghalaya

Progress:
One extensive and local surveys was conducted in various parts of East Khasi Hills. Locality records were noted and population estimation was also conducted in some survey areas. Additionally, some other specimens collected during the surveys were identified as follows. Amphibia: 5 species, Pisces: 8 species and Reptiles: one species.

06

Taxonomic studies
of hill stream fishes
of Meghalaya

Investigator:	Dr. Dimos Khyntiam
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	Taxonomic studies of hill stream fish fauna in Meghalaya

Progress:
Two surveys were conducted. A total of 1479 specimens were collected and identified 157 specimens of fishes belonging to 20 species and 26 specimens of crustacean belonging to 3 species.

WESTERN
REGIONAL
CENTRE
(WRC),
PUNE

01

Faunistic survey of Koyna Wildlife Sanctuary, Maharashtra

Investigators:	Officer-in-Charge & Scientific staff
Period:	April 2015 to March 2018
Status:	Completed
Objective:	To ascertain the diversity profile of different faunal groups of Koyna Wildlife Sanctuary.

Outcome:

Five surveys were undertaken during the period covering the entire sanctuary. This helped to ascertain the faunal diversity of the Koyna Sanctuary on the basis of collected specimens and animals observed at various places in the area of study. A total of 394 species (23 species of mammalia, 127 species of Aves, 21 species of Amphibia, 15 species of Mollusca, 04 species of Decapoda, 20 species of Araneae, 04 species of Collembola, 20 species of Orthoptera, 101 species of Lepidoptera (moths), 14 species of Diptera and 45 species of Coleoptera) including one new species, *Bolboceras sahyadriensis* Kalawate & Hillert, 2018 (Coleoptera: Geotrupidae) have been documented.

02

Faunistic survey of Navegaon National Park, Maharashtra

Investigators:	Officer-in-Charge & Scientific staff
Period:	April 2015 to March 2018
Status:	Completed
Objective:	To ascertain the diversity profile of different faunal groups of Navegaon National Park, Maharashtra.

Outcome:

Two surveys were undertaken covering the entire National Park. A total of 498 species (21 species of Araneae, 04 species of Decapoda, 03 species of Collembola, 18 species of Coleoptera, 50 species of Lepidoptera, 11 species of Odonata, 23 species of Orthoptera, 14 species of Mollusca, 07 species of Pisces, 06 species of Amphibia, 279 species of Aves and 62 species of Mammalia) have been documented from the Navegaon National Park.

03

Tropical Rainforest Ecosystems: Western Ghats–Maharashtra - Darkling Beetles (Tenebrionidae: Coleoptera)

Investigators:	Dr. V.D. Hegde & Dr. Vasanthakumar
Period:	April 2016 to March 2018
Status:	Completed
Objective:	To ascertain the diversity of darkling beetles of Northern Western Ghats of Maharashtra.

Outcome:

Around 160 localities were visited in the northern part of Western Ghats to collect darkling beetles. The collections were done mainly by hand picking and dusting methods. Light traps were also used to collect these beetles. The study revealed the report of 66 species belonging to 30 genera of the family Tenebrionidae from Northern Western Ghats of Maharashtra. Five species of darkling beetles are reported as new record to Maharashtra state and one species new to India.

04

Biodiversity Hotspots and Tropical Rainforest Ecosystems: Western Ghats, Maharashtra

Phase–I: Noctuidae (Insecta: Lepidoptera: Heterocera) of Northern Western Ghats, Maharashtra

Investigator:	Dr. Aparna S. Kalawate
Period:	April 2015 to March 2018
Status:	Completed
Objective:	To ascertain the diversity profile of Noctuidae fauna of Western Ghats of Maharashtra.

Outcome:

This study documented 54 species under 33 genera in 13 subfamilies of Noctuidae from Northern

Western Ghats, Maharashtra. One species of orange yellow moth, *Aegocera venulia* (Cramer) (Noctuoidea: Noctuidae) has been reported for the first time from Maharashtra.

05

Fauna of Yawal Wildlife Sanctuary, Jalgaon, Maharashtra

Investigators:	Officer-in-Charge & Scientific staff
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	To ascertain the diversity profile of fauna of Yawal Wildlife Sanctuary.

Progress: Two surveys were conducted and identified, 2 species of prawns and 2 species of Rodentia. Further identification of specimens is in progress.

06

Taxonomic studies of Amphibians of Western Ghats

Investigator:	Dr. K.P. Dinesh
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	Taxonomic studies of Amphibians of Western Ghats.

Progress: One study tour was conducted to CES, IISc, to study the family Nyctibatrachidae Blommers-Schlösser, 1993 (Anura: Amphibia) in the Western Ghats. One field survey to Agasthyamala Biosphere Reserve (Neyyar, Peppara and Shendurney Wildlife Sanctuaries in Kerala State) was conducted along with WGRC and SRC and collected 111 specimens of Amphibia. The specimens collected from the field survey were deposited in the DNA laboratory for barcoding studies.

CENTRAL
ZONE
REGIONAL
CENTRE
(CZRC),
JABALPUR

01

Faunal Diversity of
Panna Tiger Reserve,
Districts Panna and
Chhatarpur, M.P.

Investigators:	Officer-in-Charge & Scientists of CZRC
Period:	April 2016 to March 2019
Status:	Ongoing
Objectives:	To study the faunal diversity of Panna Tiger Reserve through the field surveys and to document the various faunal groups.

Progress:
One survey conducted. 1140 specimens of various fauna were collected, comprising 41 specimens of spiders, 2 specimens Scorpionida, 10 specimens of Ephemeroptera, 142 specimens of Odonata, 41 specimens of Orthoptera, 23 specimens of Dermaptera, 14 specimens of Mantodea, 74 specimens of Hemiptera, 46 specimens of Neuroptera, 596 specimens of Lepidoptera, 89 specimens of Coleoptera, 5 specimens of Diptera, 21 specimens of Trichoptera, 5 specimens of Hymenoptera, 6 specimens of Mollusca, 13 specimens of Amphibia and 02 specimens of Reptilia. Identified: 228 species, 185 genera and 88 families comprising Odonata, Lepidoptera (Butterflies and Moths), Coleoptera, Hemiptera, Arachnida (Araneae), Decopoda, Amphibia, Reptilia, Aves and Mammals.

Significant findings:
88 species of moths (Lepidoptera) reported for the first time from this sanctuary.

Reddyanus assamensis (Oates, 1888)



Faunal Diversity of
Kanha Tiger Reserve
and National Park,
Madhya Pradesh

02



Fejervarya orissaensis (Dutta, 1997)

Investigators:	Officer-in-Charge & Scientists of CZRC & ZSI Hqs,Kolkata
Period:	April 2017 to March 2020
Status:	Ongoing
Objectives:	To study the faunal diversity of Kanha Tiger Reserve and National Park through the field surveys and to document the various faunal components.

Progress:
One survey was undertaken and collected 455 specimens of 17 faunal groups. Identified 27 species of mammals, 137 species of birds, 18 species of reptiles, 9 species of amphibians, 4 species of scorpions, 48 species of butterflies (Lepidoptera), 33 species of moths (Lepidoptera) 12 species of Odonata and 05 species of Hemiptera. Significant findings: Beddom's lacerta-*phisops beddomei* (Jerdon, 1870)collected from Bhaisanghat is a new report of Reptile for the State of Madhya Pradesh. Furthermore, 33 species of Moths, 5 species of Hemiptera reported for the first time from this Tiger Reserve.

03

Faunal Diversity of
Sanjay, Panna and
Fossil National Parks,
district Panna
& Chhattarpur,
Madhya Pradesh

Investigators:	Officer-in-Charge & Scientists of CZRC
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To study the faunal diversity of Sanjay, Panna & Fossil National Parks through the field surveys and to document the various faunal components.

Progress:
One survey undertaken and collected 771 specimens which represented 407 specimens from Sanjay National Park, 168 specimens from Panna National Park and 198 specimens from Fossil National Parks of Madhya Pradesh. 12 species of Butterflies, 19 species of Moths, 2 species of Coccinellidae and one species of Mantodea were identified and recorded for the first time from Sanjay National Park.

Vulpes bengalensis (Shaw, 1800)



04

Status survey of
Critically Endangered
Sacred grove bush
frog *Raorchestes
sanctisilvaticus*
(Das and Chanda, 1997)

Investigators:	Dr. Pratyush P. Mohapatra & Dr. Saipari Sailo
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	- To study distribution and occupancy of sacred grove bush frog <i>Raorchestes sanctisilvaticus</i> (Das and Chanda, 1997) in Madhya Pradesh and Chattisgarh - To assess the status of other bush frogs occurring in the study area. - To evaluate habitat requirement of the species - To identify the potential factors affecting the survival of wild population and assessment of the level of human impact if any.

Progress:
One survey undertaken at Amarkantak, Annuppur district, Madhya Pradesh and Jagdalpur district, Chhattisgarh. 335 specimens comprising 280 vertebrates (233 specimens of Amphibia and 47 specimens of Reptilia) and 55 invertebrates (4 specimens of Araneae, 26 Scorpionida, 2 Coleoptera, 1 Hemiptera, 20 Hymenoptera and 2 Decapoda) were collected.

Significant findings:
246 individual of *Raorchestes sanctisilvaticus* (Das and Chanda, 1997) were observed during the survey and 53 individuals were collected for taxonomy study on intra-species variations. Besides, *Minervarya pierrei* (Dubois, 1975), *M. granosa* / *M. agricola* are the two species of amphibians recorded for the first time from Chhattisgarh along with first report of two species of reptiles namely, *Eutropis allapalensis* and *Sitana spinaecephalus*.

DESERT REGIONAL CENTRE (DRC), JODHPUR

Studies on Faunal Diversity of Rajasthan - Gaps in Research

01



Desert Wheatear *Oenanthe deserti*
(Temminck, 1825)

Investigators: Dr. Sanjeev Kumar, Dr. H. S. Banyal
& Scientific staff

Period: April 2013 to March 2016

Status: Completed

Objectives:

- Survey, observation, collection, identification and documentation of faunal diversity components of invertebrates & vertebrates from unexplored areas of Rajasthan.
- To develop the faunal diversity database and species distribution in the State of Rajasthan.

Outcome:

The State of Rajasthan is geographically largest in India with unique ecosystem of the Thar Desert. It has an area of 3,42,239 sq. km comprising of 33 districts out of which 11 are truly arid in nature whereas 2 districts having some part under arid zone. The other 20 district has semi-arid, sub-humid and humid climatic zones. Though much work has been carried out on faunal diversity especially dealing with area of the Thar Desert and some important protected areas but gaps still exist on various faunal groups especially of invertebrates. In this context 10 field surveys were conducted in 27 districts of Rajasthan and identified 15 species of ants, 22 species of butterflies, 46 species of fishes, 10 species of amphibians, 44 species of reptiles, 459 species of aves and 49 species of mammals.

02

State Fauna –
Rajasthan

Investigator:	Officer-in-Charge
Period:	April 2016 to March 2017
Status:	Completed
Objective:	To compile the report on faunal diversity of Rajasthan State based on surveys made at the Centre so far and existing literature.

Outcome:
Comprehensive report of faunal diversity of Rajasthan has been made for the first time. Total 859 vertebrate species are documented in this part. Rajasthan has a rich faunal diversity. The faunal diversity of Rajasthan includes 141 species of fishes, 13 amphibians, 81 reptiles, 532 aves and 92 species of mammals. Besides, the list of Fishes, Amphibians, Reptiles Birds and Mammals of Rajasthan is compiled separately based on literature review and field observations/ investigations.

Sykes's Crested Lark *Calerida deva* (Sykes, 1832)



Studies on Faunal
Diversity of Dry
Grasslands of the
Thar Desert

03



View of Thar Desert

Investigators:	Dr. Sanjeev Kumar, Dr. H. S. Banyal & Scientific staff
Period:	April 2015 to March 2018
Status:	Completed
Objectives:	Inventorisation and documenting the faunal diversity associated with grasslands of the Thar Desert.

Outcome:
The India arid zone constitutes an area of 12 percent of the country's landscape and occupies over 3, 20,000 sq. km. located in the parts of Rajasthan (62%), Gujarat (19%), Punjab and Haryana (9%), Andhra Pradesh and Karnataka (10%). The area in the States of Rajasthan, Gujarat, Punjab and Haryana covering almost 90% of the total Indian arid zone is known as the 'Thar Desert'. Thar, one of the smallest deserts in world is also considered to be a unique desert because of its location at the crossing where Palaearctic, Oriental and Saharan elements of biodiversity are found. The present programme was undertaken to know the faunal diversity of dry grasslands of Thar Desert in the present scenario. 14 species of fishes, 6 species of amphibians, 13 species of reptiles, 261 species of birds and 18 species of mammals identified and studied so far. Important grassland species of aves such as *Ardeotis nigriceps* (Vigors, 1831) and *Chlamydotis undulata* (Jacquin, 1784) were sighted from the grasslands of Kachchh region whereas, *Sypheotides indicus* (Miller, 1782) was observed in the grasslands of Kachchh and Ajmer region.

04

Studies on Faunal

Diversity of Narayan

Sarovar Wildlife

Sanctuary, Gujarat

Investigators:	Dr. Sanjeev Kumar, Dr. H. S. Banyal & Scientific staff
Period:	April 2017 to March 2020
Status:	Ongoing

Objectives:

- Inventorization and documenting the faunal diversity associated with Narayan Sarovar WL Sanctuary.
- Developing Datasets on exotic species and their status in the Narayan Sarovar Sanctuary.
- Digital Inventory of Avifauna and other vertebrates of Narayan Sarovar WL Sanctuary.
- Assessment of the threatened/endangered faunal species of the Narayan Sarovar WL Sanctuary.

Progress:

The Narayan Sarovar Wildlife Sanctuary is in the western most part of India in the Kachchh district of Gujarat and supports most remarkable floral and faunal diversity. It represents a distinct gene pool and harbours several rare and endangered faunal elements. It was notified as a Sanctuary in 1981. Though much work has been carried out in the Rann of Kachchh but this protected area was not thoroughly surveyed and hence the present research programme was undertaken to fill the existing gap. So far, 4 species of fishes recorded for the first time from the sanctuary. Besides, 5 species of amphibians, 17 species of reptiles, 261 species of birds and 18 species of mammals are recorded and identified from the sanctuary.

Chamaeleo zeylanicus Laurenti, 1768



Studies on Faunal

diversity of

Jaisamand Wildlife

Sanctuary, Rajasthan

05



Oriental Honey-Buzzard *Pernis ptilorhynchus ruficollis*
 (Lesson, 1830)

Investigator:	Officer-in-charge
Period:	April 2018 to March 2019
Status:	Initiated
Objectives:	Inventorisation and documenting the faunal diversity of Jaisamand WL Sanctuary based on literature.

Progress:

Since, very little information is available so far on the faunal groups of the WL Sanctuary some more literature review is in under process.

06

Exploration of Ichthyofaunal diversity in some selected tributaries of Chambal riverine system, Rajasthan, India

Investigators:

Dr. H. S. Banyal, Dr. Sanjeev Kumar & Scientific staff

Period:

April 2018 to March 2019

Status:

Initiated

Objectives:

- Survey, observation, collection, identification and documentation of the fish diversity in selected tributaries of Chambal Riverine system in Rajasthan state including studies on threats to various species of the fishes.
- To develop the database of the fishes and their distribution in the selected tributaries of Chambal Riverine system in Rajasthan state.
- To prepare digital and updated Inventory of Ichthyofauna in the entire area of study.
- Assessment of the threatened/endangered fish faunal species in the entire area of study.

Progress:

The present research programme was proposed to explore the fish diversity component of water bodies of Rajasthan to fill the existing gaps. Surveys yielded in the identification fo 58 species of fishes. Besides, 5 species of amphibians, 12 species of reptiles, 72 species of aves and 13 species of mammals were also recorded and identified in the field.

Systemus sarana (Hamilton,1822)



07

Studies on diversity of pollinating bees (Apoidea: Hymenoptera) of Semi-Arid and Desert Ecosystem



Colony of Apis florea Fabricius, 1787

Investigators:

Dr. R. H. Raina & Dr. Sanjeev Kumar

Period:

April 2018 to March 2021

Status:

Initiated

Objectives:

- To study the taxonomy based on some important morphological features including genitalic characters with a view to review the pollinating bees of study area.
- To determine the richness and abundance of bee species in different habitats of semi-arid and desert ecosystem of Rajasthan by repeated surveys and consulting the old entomological literature and other sources.
- To record the present distributional status of different bee species from the study area.

Progress:

The systematic field surveys of pollinating bees were carried out in selected regions of different agro-climatic zones in the Semi-Arid and Desert Ecosystem of Rajasthan state. So far, two surveys undertaken of the semi-arid and Desert ecosystem of Rajasthan State. 35 species of insects have been identified and morphological characterization of 14 species of pollinating bees were carried out.

NORTHERN REGIONAL CENTRE (NRC), DEHRADUN

Fauna of Agroecosystem Haryana and Punjab

01

Investigators:	Officer-in-Charge & Scientific staff
Period:	April 2017 to March 2019
Status:	Ongoing
Objective:	Compilation of information based on collections, reports and published data.

Progress:
The information of six faunal groups from Haryana completed comprising Nematoda (23 species belonging to 2 orders); Insecta (Lepidoptera : 63 species of 41 genera under 5 families) Orthoptera (19 species belonging to 2 families and 17 genera); Amphibia (7 species of anura); Reptilia (25 species of 19 genera under 16 families and 3 orders); Aves (535 species belonging to 88 families and 22 orders) and Mammals (62 species belonging to 7 orders and 23 families) and two groups: Odonata and Pisces are in process. While, from Punjab state, compilation is in process.

View of Agroecosystem in Haryana



02

Fauna of
Uttar Pradesh
Bird Sanctuaries

Investigators:	Officer-in-Charge & Scientific staff
Period:	April 2017 to March 2019
Status:	Ongoing
Objectives:	Faunistic survey to Uttar Pradesh Bird Sanctuaries and to compile the data in the form of publication, Conservation Area series.

Progress:

Two surveys were conducted. During first survey, a total 1136 specimens belonging to 16 groups from four Bird Sanctuaries of Uttar Pradesh. Several avian and mammals species were observed from Patna B.S., Etah, Sur Sarovar B. S., Agra, Saman B.S., Mainpuri, Nawabganj B.S.,Unnao, Uttar Pradesh. Second extensive survey was conducted to six Bird Sanctuaries (Patna BS, Sur-Sarovar BS, Sandi BS, Saman BS, Lakh-Bahosi BS, Nawabganj BS) of Uttar Pradesh, 65 to 100 species of birds in each sanctuary were observed, apart from collections of various faunal groups. 1294 specimens of 9 orders were collected.

Twelve species of mammals, 136 avian species, 6 of reptiles, 28 of Lepidoptera, 12 of Odonata and 9 species of Nematoda identified so far.

Baya Weaver, *Ploceus philippinus* (Linnaeus, 1766)



Forest Insect diversity
of North-Western
Himalayas

03



Chocolate Pansy, *Junonia iphita* (Cramer, 1779)

Investigators:	Officer-in-Charge & Scientists
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To identify the Forest Insect diversity through surveys and collection in different habitat and zones of study areas and to prepare inventory/ checklist of Forest insect along with their abundance.

Progress:

One tour conducted to Himachal Pradesh. Total of 978 specimens of different Insect orders (Lepidoptera, Orthoptera, Hymenoptera, Diptera, Odonata, Coleoptera, Hemiptera, and Mantoidea) were collected from Dalhousie, Baurmore and Chamba forest areas under Chamba Forest Division, Himachal Pradesh. Identified 40 species of Papilionoidea and 25 species of Acridoidea.

SOUTHERN REGIONAL CENTRE (SRC), CHENNAI

Fauna of Point Calimere Wildlife Sanctuary, Tamil Nadu

01

Investigators:	Officer-in-Charge and Scientific staff.
Period:	April 2015 to March 2018
Status:	Ongoing
Objective:	To document the fauna of Point Calimere Wildlife Sanctuary.

Progress:
A total of 182 species of birds, 31 species of mammals, 15 species of amphibians, 42 species of reptiles, 32 species of butterflies and 17 species of dragonflies documented.

Significant findings:
Well conserved viable population of Black buck (*Antelope cervicapera*) and Greater Flamingo (*Phoenicopterus roseus*) exist in the sanctuary. During the survey period, the sanctuary was affected by major draught and a cyclone. The cyclone has affected east coast dry evergreen forest ecosystem.

View of Agroecosystem habitat in Punjab

Lesser known Fauna of Cauvery Estuary, Tamil Nadu

02

Investigators:	Officer-in-Charge and Scientific staff
Period:	April 2015 to March 2018
Status:	Ongoing
Objective:	To document lesser known fauna of Cauvery Estuary.

Progress:
All surveys completed. 89 birds, 12 species of mammals, 18 species of Odonates identified. All the species reported are common to east coast estuaries.

03

DNA barcoding of
selected faunal
groups/species

Investigator:	Dr. Ranjana
Period:	April 2018 March 2021
Status:	Ongoing
Objective:	To create DNA barcode of fauna of India.

Progress:

One hundred and thirty sequences of Indian fauna were generated and submitted to NCBI and BOLD. Mammals (6 species); Pisces (28 species); Odonata (3 species); Diptera (6 species); Lepidoptera (4 species); Coleoptera (3 species); Crustacea (Prawns) (5 species) Crustacea (1 species); Mollusca (1 species); Reptilia (2 species.); Araneae (2 species) and Hemiptera (4 species).

04

Fauna of Meghamalai
Wildlife Sanctuary and
adjoining landscapes,
Tamil Nadu

Investigators:	Officer- in-Charge and scientific staff
Period:	April 2018 to March 2020
Status:	Initiated
Objective:	To document the Fauna of Meghamalai Wildlife Sanctuary and adjoining landscapes, Tamil Nadu.

Progress:

One survey conducted and 4158 specimens of different faunal groups were collected. The region is underexplored and biodiversity rich with several endemic and threatened species. The sanctuary has good population of Gaur (*Bos gaurus*), Sambar (*Rusa unicolor*), Elephant (*Elephas maximus*), Leopard (*Panthera pardus*), Tiger (*Panthera tiger*). Endemic and threatened species such as Yellow Throated Bulbul (*Pycnonotus xantholaemus*) and Salim Ali Fruit Bat (*Latidens salimalii*) were also observed.

Significant findings:

A population of Yellow Throated Bulbul (*Pycnonotus xantholaemus*) was observed in the dry thorn forest patches of the sanctuary. The roost of Salim Ali Fruit Bat (*Latidens salimalii*) in a cave deep inside the core area was located.

05

Phylogeography of
Blackbuck (*Antilope
cervicapra*) of India

Investigator:	Dr. Ranjana Bhaskar
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To understand phylogeography and population structure of Black Bucks in India.

Progress:

Four surveys including local surveys in Tamil Nadu, Karnataka, Andhra Pradesh and Telangana were conducted to collect samples. 43 sequences of wild ungulates were submitted in NCBI and BOLD as *Antilope cervicapra* (23); *Rusa unicolor* (2); *Muntiacus muntjak* (5); *Cervus duvaucelii* (7) *Bos gaurus* (3) *Boselaphus tragocamelus* (3).

Significant findings:

In all the four southern states surveyed the Black Bucks are well protected and good population exists.

Antilope cervicapra (Linnaeus, 1758)



06

Fauna of Conservation
Area: Fauna of
Agasthyamalai
Biosphere Reserve

Ratufa indica (Erxleben, 1777)



Coordinators:	Dr. K.A. Subramanian, Dr. P.M. Sureshan & scientific staffs
Investigators:	Subject experts.
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To study and inventorize the fauna of Agasthyamalai Biosphere Reserve

Progress:
Conducted two combined surveys jointly with
WGRC. One survey to the Agasthyamala Biosphere
Reserve (Tamil Nadu part). 1905 specimens of
representative faunal samples collected. Second

survey conducted to Kerala part of Agasthyamalai
Biosphere Reserve and collected 1200 specimens of
representative faunal samples.

Report of SRC: A total of 2523 specimens under 30
groups of invertebrates and vertebrates were
collected. In addition following groups were also
identified. Rhizopoda: 6 specimens to 3 species.
Rotifera: 36 specimens belonging to 12 species,
Cladocera: 34 specimens belonging to 14 species,
Pisces: 38 specimens belonging to 12 species and 22
species of testate amoebae.

GANGETIC
PLAINS
REGIONAL
CENTRE
(GPRC),
PATNA

Mollusca and Zooplankton
of temporary and
permanent water bodies
in and around Valmiki
Tiger Reserve,
Kusheshwarasthan,
Saraiyaman Lake and
GogabilPakhsiVihar
(IBA-sites) in Bihar

01

Investigator:	Dr. Gopal Sharma
Period:	April 2014 to March 2016
Status:	Completed
Objectives:	To study and inventorize the Mollusca and zooplankton of temporary and permanent water bodies in and around Valmiki Tiger Reserve, Kusheshwarasthan, Saraiyaman Lake and GogabilPakhsi Vihar (IBA-sites) in Bihar

Outcome:
The study provides an updated list from the areas surveyed including Mollusca: 37 species, Zooplankton: 38 species, Annelida: 9 species, Arthropoda: 1 species and Crustacea: 9. The study forms first report on faunal diversity from the area.

Fauna of Jharkhand
(Aquatic invertebrates
and Lepidoptera)

02

Investigators:	Dr. Gopal Sharma & Dr. Navneet Singh
Period:	April 2015 to March 2017
Status:	Completed
Objectives:	To study and inventorize the Mollusca, Zooplankton and Lepidoptera of Jharkhand.

Progress:
The study revealed an updated list of 42 species of Mollusca, 72 species of Zooplankton, 11 species of Amphibians, 56 species of Fishes, 43 species of Reptiles and 350 species of Lepidoptera. Besides observations were made on 209 species of Birds and 28 species of Mammals.

03

Fauna of Hazaribagh Wildlife Sanctuary, Hazaribagh, Jharkhand

Investigators:	Dr. Gopal Sharma & Dr Navneet Singh
Period:	April 2015 to March 2017
Status:	Completed
Objectives:	To study and inventorize the Mollusca, Zooplankton and Lepidoptera of the Hazaribagh Wild life Sanctuary,Jharkhand

Outcome:

The study reports updated list of 210 species of Lepidoptera, 23 species of Mollusca, 22 species of Zooplankton, 7 species of Amphibians, 36 species of Reptiles and 61 species of Bird.

04

Fauna of Terai Grassland of Gangetic Plains

Investigators:	Officer-in-Charge and other Scientific staff
Period:	April 2012 to March 2018
Status:	Completed
Objectives:	To study and inventorize the Fauna of Terai Grassland of Gangetic Plains.

Outcome:

Collections include 4166 specimens comprising Lepidoptera, Mollusca, Aquatic Insecta, Crustacea and Amphibia. Besides 50 vials of samples were collected for the study of zooplanktons. 78 species of birds were also observed.

The study provides an updated list of 655 species comprising 29 species of Mollusca, 44 species of Zooplankton, 62 species of butterflies, 320 species of moths 8 species of Amphibians, 7 of Reptiles, 205 of Birds, and 34 species of Mammals. Two new species and one new record to India of order Lepidoptera family Erebidiae has been published.

Fauna of Lawalong Wildlife Sanctuary, Chatra, Jharkhand

05

Investigators:	Dr. Gopal Sharma & Dr Navneet Singh
Period:	April 2015 to March 2017
Status:	Ongoing
Objectives:	To study and inventorize the Fauna of Lawalong Wildlife Sanctuary, Chatra, Jharkhand.

Progress:

The study provides an updated list comprising Mollusca, Zooplankton, Annelida, Aquatic Arthropoda, Lepidoptera, Amphibians, Reptiles, Birds and Mammals. The faunal study of the Lawalong WLS was done for the first time.

Faunal Diversity of Rajgir (Pant) WLS Rajgir and Budha WLS, Gaya

06

Investigators:	Dr. Gopal Sharma & Dr Navneet Singh
Period:	April 2017 to March 2019
Status:	Ongoing
Objectives:	To study and inventorize the Faunal Diversity of Rajgir (Pant) WLS Rajgir and Budha WLS, Gaya.

Progress:

Collections include 4166 specimens comprising Lepidoptera, Mollusca, Aquatic Insects, Crustacea and Amphibia. Besides 50 vials of samples were collected for the study of zooplanktons. 78 species of birds were also observed.

HIGH ALTITUDE REGIONAL CENTRE (HARC), SOLAN

Faunal Diversity of Chail Wildlife Sanctuary, District Solan, H.P.

01

Investigators:	Dr. Avtar Kaur Sidhu, Dr. Indu Sharma, Dr. Anil Kumar, Dr. R. Paliwal & Dr. Kamal Saini
Period:	April 2012 to March 2015
Status:	Completed
Objectives:	To survey, explore and monitoring of faunal diversity from the Sanctuary, observe/record the Aves and Mammal species of the sanctuary and documentation of the fauna of Chail WLS.

Outcome:
The Document on "Faunal Diversity of Chail Wildlife Sanctuary" contains 369 species referable to 302 genera belonging to 13 faunal groups. In this document the Invertebrate fauna has been documented for the first time. 142 species are first record, 04 species are indigenous to Palaearctic region, 03 species are associated with crops, 05 species are new records from the state of Himachal Pradesh. Among vertebrate fauna, one species is under the Endangered category as per IUCN Red list and three species are under Threatened category of IUCN Red list.

Faunal Resources of Sainj Wildlife Sanctuary, district Kullu (HP.)

02

Investigators:	Dr. Avtar Kaur, Dr. Gaurav Sharma, Dr. Indu Sharma, Dr. T. Kubendran, & Dr.Kamal Saini
Period:	April 2015 to March 2019
Status:	Ongoing
Objectives:	To study and inventorize the faunal diversity of Sainj WLS, District Kullu (Himachal Pradesh)

Progress:
Identification include 18 species Protozoa (Rhizopoda), 07 of Annelida, 43 of Lepidoptera (Papilionoidea), 19 of Lepidoptera (Heterocera), 7

of Ephemeroptera, 39 of Orthoptera, 16 of Odonata , 4 of Pisces, 5 of Herpetofauna, 74 of Birds and 12 species of Mammals.

Significant findings:

The fauna recorded from the sanctuary is unique as the area represents the temperate and alpine ecosystems. Thus, the documentation of fauna of the sanctuary will be useful in formulating policies for conservation of rich biodiversity and sustainable development.

03

Faunal Resources of Sangla Valley, District Kinnaur (H.P.)

Investigators:	Dr. Avtar Kaur Sidhu, Dr. Gaurav Sharma, Dr. Indu Sharma, Dr. T. Kubendran & Dr.Kamal Saini
Period:	April 2015 to March 2019
Status:	Ongoing
Objectives:	To study and inventorize the faunal diversity of Sangla Valley, district Kinnaur (Himachal Pradesh)

Progress:

Identification include 44 species of Protozoa , 06 of Annelida, 33 of Lepidoptera (Papilionoidea), 23 of Lepidoptera (Heterocera), 8 of Ephemeroptera, 37 of Orthoptera, 09 of Odonata , 2 of Pisces, 2 of Herpetofauna, 65 of Birds and 12 species of Mammals.

Bhoj Patra Forest, Sangla Valley



Faunal Diversity of the State of Jammu and Kashmir

04



Herd of Kiang, Equus kiang Moorcroft,1841

Investigators:	Dr. Avtar Kaur Sidhu Dr. Gaurav Sharma, Dr. Indu Sharma, Dr. T. Kubendran & Dr. Kamal Saini
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To study and inventorize the faunal diversity of the State of Jammu and Kashmir

Progress:

Three Surveys have been conducted. Identification include 21species of Lepidoptera (Papilionoidea), 05 of Lepidoptera (Heterocera), 10 of Ephemeroptera, 02 of Tricoptera, 02 of Plecoptera, 07 of Orthoptera, 08 of Odonata , 15 of Pisces, 05 of Herpetofauna, 54 of Birds and 13 species of Mammals.

MARINE
BIOLOGY
REGIONAL
CENTRE,
(MBRC)
CHENNAI

01

Revision of
Scleractinian coral
genus *Montipora*
Blainville, 1830,
and preparation of
annotated checklist
of Scleractinians
in Indian waters

Investigator:	Dr Rajkumar Rajan
Period:	April 2014 to March 2017
Status:	Completed
Objectives:	Revision of Scleractinian coral <i>Montipora</i> Blainville, 1830 and preparation of annotated checklist of Scleractinians in Indian waters.

Outcome:
A total of 356 specimens of scleractinians including 166 specimens of *Montipora* have been collected along with their *in-situ* photographs. 124 specimens of *Montipora* were identified from the unidentified collections of Zoological Survey of India. 46 specimens of *Montipora* collected and deposited by Dr. C. S. Gopinathapillai during 1964-67 at the collections in Mandapam Centre of CMFRI have been studied and the identity verified with the recent literature. The new records reported in this study are: 1) *M. incrassata* (Dana, 1846), 2) *M. hoffmeisteri* Wells, 1954, 3) *M. floweri* Wells, 1954, 4) *M. millepora* Crossland, 1952, 5) *M. caliculata* (Dana, 1846), 6) *M. calcarea* Bernard, 1897 *M. friabilis* Bernard, 1897, 8) *M. cocosensis* Vaughan, 1918, and 9) *M. turtlensis* Veron & Wallace, 1984.

Survey locality



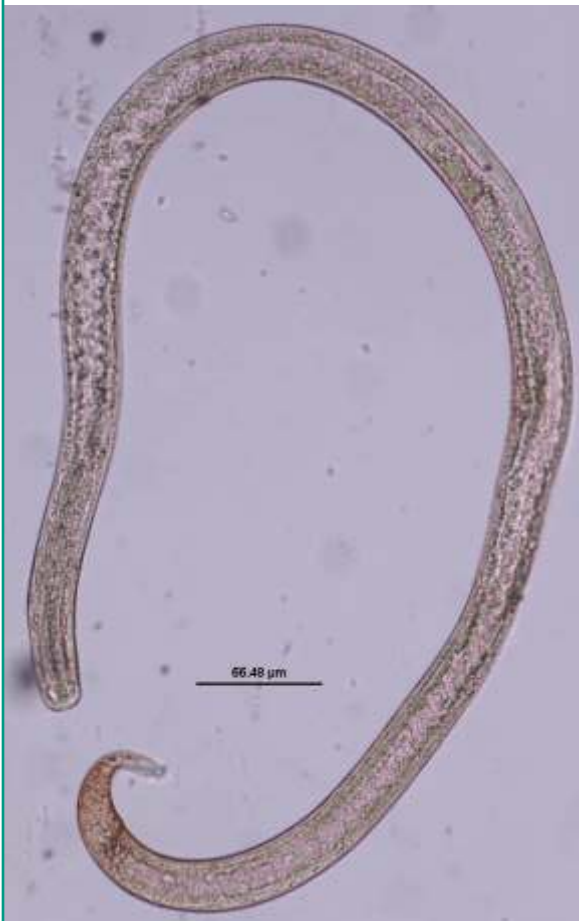
02

Fauna of West Coast - Meiofauna with special reference to free-living marine nematodes

Investigator:	Dr. G. Sivaleela
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To study the diversity of marine nematodes of West coast

Progress:
Two surveys conducted to 20 different coastal zones of Maharashtra and Goa and collected a total of 69 meiofauna , 112 species and 492 specimens in sandy, rocky, muddy and mangrove habitats were recorded. Out of which 2 species were new records to India.

Metachromadora suecica Schulze, 1938



03

Studies on the taxonomy of Polychaeta in the Coral reefs of Gulf of Mannar



Chloeia flava (Pallas, 1766)

Investigator:	Dr. Anand Kumar
Period:	April 2016 to March 2019
Status:	Ongoing
Objectives:	To assess the taxonomic status of the class polycheta and mapping of distribution of polychaeta fauna in Gulf of Mannar.

Progress:
Two surveys conducted and collected 283 specimens and identified 92 specimens which includes 15 species of Polychaetes.

04

Coral Reef Dwelling
Polyclads of Gulf of
Mannar Biosphere
Reserve, Tamil Nadu

Investigators:	Dr. P. Padmanaban & Sri. R. Rajendra Kumar
Period:	April 2016 to March 2019
Status:	Ongoing
Objectives:	To assess the taxonomy and mapping of distribution of Polyclads fauna in Gulf of Mannar.

Progress:

The surveys were conducted to the reefs surrounding the Shingle, Krusadai Pullivasal Poomarichan, Manoli and Hare Island of Mandapam group, Mulli, Valai, Thalayari, Appa, Valimunai and Anaipar Island from Keelakarai group, Vaan, Kasuwar and Karaichalli in Tuticorin group and Nallathanni, Upputhanni and Vilanguchalli in Vembar group surveyed in Gulf of Mannar Marine Biosphere Reserve by means of snorkeling and direct search method was used; specimens were hand collected, during low tides in the intertidal region by overturning rocks, coral skeletal rubbles transferred into sample containers with soft brushes. Live specimens were photographed in situ to record for true colour identification and morphological studies.

Pseudoceros galatheensis Dixit, Raghunathan & Chandra, 2017



05

Population studies
of commercially
viable Sea cucumber
species in Gulf of
Mannar Marine
National Park and
Palk Bay



Holothuria scabra Jaeger, 1833

Investigators:	Dr. Rajkumar Rajan, Dr. P. Padmanaban & Dr. Anand Kumar,
Period:	April 2017 to March 2019
Status:	Ongoing
Objective:	Population studies of commercially viable Sea cucumber species in Gulf of Mannar Marine National Park and Palk Bay

Progress:

Three surveys completed in Gulf of Mannar and Palk bay localities. A total number of 142 individuals collected belongs to 6 species of holothuria

06

Status survey of
Sea turtles of
Chennai coast

Investigators:	Dr. P. Padmanaban, Shri. Anand Kumar & Dr. Rajkumar Rajan
Period:	April 2017 to March 2019
Status:	Ongoing
Objective:	To assess the Status of Sea turtles of Chennai coast.

Progress:
Five surveys were undertaken from December 2017 to March 2018, along the stretch of Chennai coast. Three species of sea turtles were identified i.e. *Lepidochelys olivacea*, - Olive Ridley Sea Turtle, *Chelonia mydas* - Green Turtle and *Eretmochelys imbricata*. Five nesting sites and tracks observed. Morphometric measurements on the carcasses of the 100 dead turtles observed were undertaken.

Lepidochelys olivacea (Eschscholtz, 1829)



Fauna of Gulf
of Mannar -
Reef fishes

07



Landscape Appa Island Keelakarai, Gulf of Mannar

Investigator:	Dr. Mrinal Kumar Das
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	To survey and Inventorize the Reef fishes of Gulf of Mannar

Progress:
Two surveys conducted and covered islands - Mulli, Valai, Thalaiyari, Vallimunai, Appa, Anaipar Van, Kasuwar, Karaichalli, Upputhanni, Nallathani and Varingachalli, covered landing centers: Mandapam, Pamban, Keelakarai, Ervadi, Valinokkam and Mundal. Collected 198 specimens of fishes and identified 49 species of reef fishes.

ANDAMAN
AND NICOBAR
REGIONAL
CENTRE
(ANRC),
PORT BLAIR

01

Status, distribution,
population dynamics
and habitat selection
of small mammals in
Andaman Islands

Investigators:	Dr. C. Sivaperuman & Shri. P.T. Rajan
Period:	April 2013 to March 2016
Status:	Completed

- Objectives:
- To determine the population status and distribution of small mammals in Andaman Islands.
 - To document endemic and endangered species.
 - To make recommendations for future monitoring of small mammal populations.

Outcome:

The present study highlights the enormous wealth of small mammals in Andaman archipelago. The study also point out that there are gaps in information which can be filled up only with further studies in this archipelago.

Twenty two species of small mammals belong to eight families and four orders. Highest number of species recorded from the order Chiroptera (15 species) followed by Rodentia (4 species). Among the recorded species the White-toothed Andaman Shrew *Crocidura andamanensis* is listed as Critically Endangered and Andaman Horseshoe Bat *Rhinolophus cognatus* is listed as Endangered in IUCN red list. The forest of Andaman Islands have only low density of small mammals especially rodents. This study reveals a strong correlation between the small mammal species richness and the tree species richness and density.

As this archipelago is the habitat for many endangered and endemic species, it is very essential to look into site requirements and habitat preferences of various species in an integrated manner while preparing management plans.

02

Spider
(Order: Araneae) fauna
of Agroecosystem
in South Andaman

Investigator:	Dr. C. Sivaperuman
Period:	April 2013 to March 2016
Status:	Completed

Objectives:

- To document the status and distribution of spider fauna of Agroecosystem in South Andaman.
- To study their distribution and habitat ecology.

Outcome:

A total of 56 species belonging to 17 families were recorded. Of all the species collected, 16.23% were male, 66.75% were female and the remaining 21.43% were immature and the species level identification was done because of their association with female or if observed emerging from the egg sac during field visit. Salticidae, Gnaphosidae, Lycosidae and Uloboridae were among the taxonomically challenging families. Out of these 17 families sampled during our survey, families like Araneidae, Salticidae, Tetragnathidae and Thomisidae were collected by sweep netting and bush beating method mainly showed more number species with each increase in sampling size in all the eleven sites.

Nephila pilipes Fabricius, 1793



Status survey of Nicobar
Megapode *Megapodius
nicobariensis* Blyth in
Nicobar Islands

Investigator:	Dr. C. Sivaperuman
Period:	April 2013 to March 2016
Status:	Completed

Objectives:

- To assess the present status and distribution of Nicobar Megapode and study the habitat relationship of Megapode during nesting and breeding season.
- To prepare conservation action plan and monitoring of Nicobar Megapode.

Outcome:

A total of 149 active mount were recorded and about 300 megapode was detected during the point transect and playback surveys. Megapode was recorded in all seven islands of Nancowry group of islands (Nancowry Island, Katchal, Kamorta, Tillanchang, Trinket, Teressa and Bompoka islands). *Megapodius nicobariensis abbotti* occurs on all of the southern group of islands, with 97 active mounds. Highest number of mount recorded in Kosingdon in Great Nicobar followed by Lawful. North Patia and Minlana in Little Nicobar group showed highest number of mounds. Similarly, the distribution of mounds also varied in Nancowry group.

Status survey of Robber
Crab *Birgus latro* in
Nicobar Islands

Investigator:	Dr. C. Sivaperuman
Period:	April 2015 to March 2018
Status:	Ongoing

Objectives:

- To assess the present status and distribution of Coconut Crab
- To prepare conservation action plan and monitoring of Coconut crab

Progress:

15 nests and 12 direct sighting of Coconut Crab *Birgus latro* Linnaeus have been observed in Great Nicobar, Little Nicobar and Nancowry group of Islands

03

04

05

Faunal diversity of
Andaman and Nicobar
Islands: Marine and
Terrestrial Fauna of
Paget group of Islands

Investigators: Dr. C. Sivaperuman
(Terrestrial Ecosystem) &
Dr. C. Raghunathan
(Marine Ecosystem)

Period: April 2016 to March 2019

Status: Ongoing

- Objectives:**
- To describe the marine fauna of Paget group of Islands
 - To describe the terrestrial fauna of Paget group of Islands

Progress:
Total of 624 species of marine and terrestrial fauna were identified. Marine: 98 species of scleractinian corals, 8 species of sea anemones, 25 species of octocorals, 13 species of hydrozoans, 24 species of sponges, 46 species of molluscs, 18 species of opisthobranchs, 4 species of polyclads, 20 species of crabs, 9 species of shrimps, 2 species of lobsters, 23 species of echinoderms, 12 species of ascidians, 175 species of fishes and 17 species of bryozoa. Terrestrial: 28 species of butterflies, 12 species of odonates, 19 species of spiders, 11 species of herpeo-fauna and 4 species of mammals.

Diploastrea heliopora Lamarck, 1816



06

Faunal diversity of
Andaman and Nicobar
Islands: Marine and
Terrestrial Fauna of Little
Nicobar group of Islands



Callyspongia (Euplacula) australis Lendenfeld, 1887

Investigator: Dr. C. Sivaperuman

Period: April 2018 to March 2021

Status: Initiated

- Objectives:**
- To assess the present status and distribution of faunal diversity (Terrestrial & Marine) of Little Nicobar Island
 - To study the species richness, abundance, and diversity of selected terrestrial and marine fauna
 - To prepare the distribution maps using ecological and GIS information and to suggest management recommendation for the conservation of the fauna of Little Nicobar Island group.

Progress:
Total of 528 species were identified from terrestrial and marine environment. Marine: 28 species of scleractinian corals, 11 species of sea anemones, 10 species of hydrozoans, 22 species of sponges, 45 species of molluscs, 12 species of opisthobranchs, 2 species of polyclads, 14 species of crabs, 9 species of shrimps, 2 species of lobsters, 30 species of echinoderms, 12 species of ascidians, 183 species of fishes, 11 species of bryozoa. Terrestrial: Identified 10 species of amphibians, 8 of reptiles, 37 of birds and 3 species of mammals.

07

Faunal diversity of Andaman and Nicobar Islands: Faunal diversity in the Agro-ecosystem in Andaman Islands

Investigator: Dr. C. Sivaperuman

Period: April 2018 to March 2021

Status: Initiated

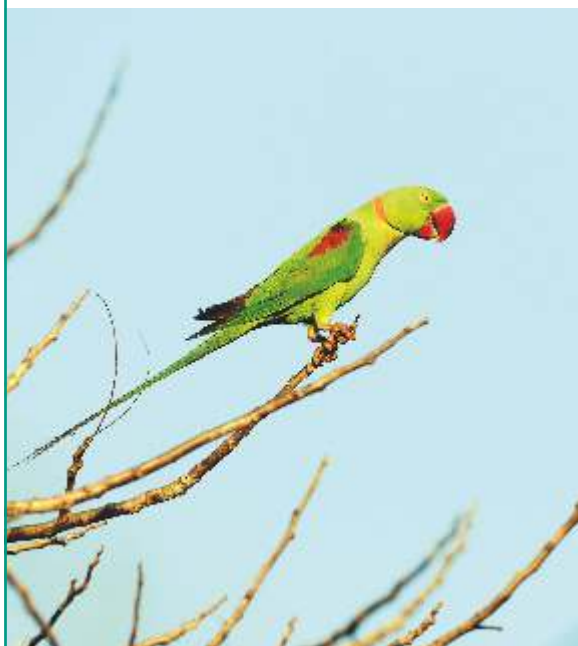
Objectives:

- To assess the major faunal diversity in the agro-ecosystem of Andaman Islands
- To analyse their association with different crops in the agro-ecosystem
- To identify the ecosystem services provided by the insects and bird communities in the agro-ecosystem
- To provide suitable management suggestions to control the bird damage to the agricultural crops

Prepress:

Total of 132 species of different groups have been recorded. Identified 35 species of Butterflies, 14 species of Spiders, 1 species of Hemiptera, 9 species of Amphibians, 14 species of Reptiles and 34 species of Birds.

Alexandrina Parakeet, *Psittacula eupatria* Linnaeus



Terrestrial Faunal Diversity of the Little Andaman Island

08



Andaman Green Imperial Pigeon,
Ducula aenea andamanica Abdulali

Investigator: Dr. Anil Kumar Dubey

Period: April 2018 to March 2021

Status: Initiated

Objective: To document the terrestrial faunal diversity of the Little Andaman Island

Prepress:

A total of 2259 individuals of terrestrial fauna were collected from the Andaman group of Islands and Little Andaman Island. Pinning, setting and labelling of 423 insects of Order Coleoptera, Hemiptera, Hymenoptera, Lepidoptera, Odonata, Orthoptera and Phasmatoidea were done. 237 permanent microscopic slides were prepared for insects of Order Hemiptera and Thysanoptera. Two species of Cerambycidae beetles viz., *Stromatium barbatum* (Fabricius, 1775), *Pelargoderus niger* (Thomson, 1878), two species of Odonata, *Diplacodes trivialis* (Rambur) and *Orthetrum chrysis* (Selys); two species of whiteflies *Dialeurodes citri* (Ashmead) and *Bemisia pongamiae* (Takahashi) are identified. One hemipteran insect genus, *Tetralicia* Harrison is reported for the first time from India. Scanning electron microscope studies have been done for fine structures for four species of whitefly (Hemiptera: Aleyrodidae) species.

09

Status of corals
and associated
macrofauna & marine
fishes of South Reef
Island and Interview
Island Wildlife
Sanctuaries,
Middle Andaman

Investigators:	Dr. Tamal Mondal & Dr. Bineesh, K.K.
Period:	April 2018 to March 2021
Status:	Initiated
Objectives:	To assess the status of corals and associated macrofauna & marine fishes of South Reef Island and Interview Island Wildlife Sanctuaries, Middle Andaman

Progress:

Total of 302 species including 75 species of scleractinian corals, 7 species of octocorals, 5 species of sea anemones, 5 species of hydrozoans, 8 species of sponges, 5 species of polyclads, 28 species of molluscs, 5 species of opisthobranchs, 1 species of nemertea, 19 species of echinoderms, 7 species of ascidians, 136 species of fishes and 1 species of mammal were identified.

Acropora humilis Dana 1846



10

Faunal Expedition to
Great Nicobar
Biosphere Reserve

Investigator:	Dr. C. Sivaperuman
Period:	April 2018 to March 2019
Status:	Initiated

Objectives:

- To assess the present status, distribution and species richness, abundance of terrestrial fauna of Great Nicobar Biosphere Reserve.
- To assess the changes in the species composition in different habitats in the recent times, especially in the context of the tsunami in 2004.
- To recommend suitable conservation measures for the management of faunal communities in the Great Nicobar Biosphere Reserve especially endemic, endangered and threatened species.
- To identify the gap areas in our knowledge on the faunal information pertaining to the Great Nicobar Biosphere Reserve.

Progress:

One major expedition conducted to Great Nicobar Island. Total of 7166 specimens were collected, from the following groups, Annelida 4, Araneae 229, Scorpionidae 34, Crustacea 44, Myriapoda 3, Thysanura 2, Collembola 10, Odonata 137, Orthoptera 146, Dictyoptera 13, Phasmida 10, Blattaria 6, Mantodea 4, Isoptera 444, Hemiptera 330, Thysanoptera 5, Neuroptera 4, Coleoptera 230, Diptera 276, Lepidoptera 4061, Hymenoptera 358, Ephemeroptera 8, Mollusca 97, Pisces 382, Amphibia 200, Reptilia 122, Aves 4, Mammalia 3, Significant findings: Hymenoptera: 3 species are new to Science. Isoptera: One species is new report to Andaman and Nicobar Islands. Hemiptera: One genus and species, *Dialeurotrachelus combodiensis* Takahshi is reported for the first time from India. Two new species, *Asialeyrodes nicobarica* sp. nov. and *Aleuroclava shompenorum* sp. nov. are discovered.

SUNDERBAN
REGIONAL
CENTRE
(SBRC),
CANNING

Faunal Diversity of
Sunderban Biosphere
Reserve

01

Investigator:	Dr. D. Suresh Chand
Period:	April 2016 to March 2018
Status:	Completed
Objectives :	To survey and inventorize the Faunal Diversity of Sunderban Biosphere Reserve.

Outcome:

Two surveys were conducted. The areas covered were Bashirhat Range and National Park East Range: Sajnekhali WLS, Pakhirala, Bidya Beat, Dobanki, Netidopani, Chamta Beat, Chandkhali Beat, Baagmara Beat, Khatwajhuri Beat, Burir Dabri Beat, Harikhali Protection camp, Kaksa protection camp. Observed 6 species of Mammals, 87 species of Birds. Identified 6 species of Reptiles, one species of Scyphozoa, one species of Horseshoe Crab, 5 species of Crabs, 2 species of Shrimps, one species of Lobster, 4 species of Molluscs, 5 species of Bivalves, 14 species of Fishes and 12 species of Orthoptera

Burirdabri Beat



02

Faunal diversity of
Sagar Island West
Bengal, India
(Combined Programme
with HQ)

Coordinator:	Officer-in-Charge
Investigators:	Dr. Valarmathi, Dr. Chitra, J. Shri. Mishra, S. S. & Dr. Sreeraj, C.R.
Period:	April 2018 to March 2020
Status:	Initiated
Objectives:	To survey and inventorize the Faunal Diversity of Sagar Island West Bengal, India.

Progress:
Two surveys were conducted to the various habitats and different localities of Sagar Island. Collections include 4774 specimens belonging to Hymenoptera, Coleopteran, Orthoptera, Arachnida, Diptera, Odonata, Hemiptera, Lepidoptera, Fishes, Mollusca, Crustacea and zooplankton and 140 samples including soil, water and moss for the analysis of Zooplankton and Protozoa.

Progress of HQ: Two surveys were conducted. Faunal samples collected include 1800+ specimens of Crustaceans comprising Prawns, Crabs, Amphipods, Branchiopods, Isopods, and Stomatopods from various ecosystems of Sagar Island (Freshwater, Marine and Mangrove). So far 905 specimen of crustaceans were identified into 15 species. Other two surveys undertaken for the study of finfishes and shellfishes and about 790 specimens collected. 69 specimens belonging to 38 species identified.

Sartoriana spinigera (Wood-Mason, 1871)



FRESHWATER
BIOLOGY
REGIONAL
CENTRE
(FBRC),
HYDRABAD

01

Studies on the
faunal diversity of
Tsomoriri lake, Ladakh,
Jammu & Kashmir

Investigators:	Dr. D.V. Rao, Dr. Deepa Jaiswal & Mrs. Sk.Rehanuma
Period:	April 2016 to March 2018
Status:	Completed
Objectives:	To study and inventorize the fauna of Tsomoriri lake.

Outcome:
Tso Moriri or Lake Moriri, is a lake in the Ladakh part of the Changthang Plateau in Jammu and Kashmir in northern India. The lake plays a fundamental role as breeding grounds and key staging posts on migration routes for several water birds belonging to six families, which is distinctive of wetland diversity and productivity.

The limnological profile of the lake has been evaluated and it differs from others as is isolated, comparatively less volumetric and thus any external pressure will affect the chemical characteristics. Though the volume of the lake is less when compared with tropical lakes it supports poor and unique fauna that includes 10 mammalian, 48 avian, one reptile, one fish, one amphipod, 17 insect larvae, three annelid and three zooplankton species. Being the only breeding grounds for migratory bird species like Black-necked Crane and Bar-headed Goose in India, proper conservation and management plan needs to be implemented for sustainable use of the wetland.

View of Tsomoriri lake



02

Studies on the
faunal diversity
of Sastamkotta
Lake, Kerala

Cooordinator:	Dr. Deepa Jaiswal
Investigators:	Subject Experts
Period:	April 2016 to March 2018
Status:	Completed
Objective:	To study and inventorize fauna of Sashtamkotta lake.

Outcome:
The study recorded a total of 378 species including 5 faunal groups of vertebrates (Pisces, Amphibian, Reptiles, Aves & Mammalia) and 9 invertebrate groups including :Rhizopoda (Protozoa), Chilopoda, Odonata, Mantodea, Hemiptera ,Coleoptera, Lepidoptera, Hymenoptera and Mollusca

Significant findings:
Two species of Hymenoptera namely *Dipara nigra* Sureshan (Chalcidae) and *Polistes (Polistella) strigosus atratus* Das & Gupta (Vespidae) reported as a new record to Kerala.

03

Fauna of Eastern Ghats-
Riverine and Hill Stream
Fishes & Molecular
Characterization

Investigator:	Dr. Boni Amin Laskar
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To study molecular characterization of riverine and hill stream fishes of Eastern Ghats

Progress:
Two surveys have been conducted in southern Eastern Ghats spreading through Kurnool district, Nallamalla range and Nellore district. Collected 1710 specimens comprising different faunal groups which include 854 specimens of fishes. 146 Barcode sequences have been submitted to NCBI and BOLD.

04

Faunistic studies
on Amrabad and
Kawal Tiger Reserve,
Telangana

Investigators:	Dr. Deepa Jaiswal Dr. S. Shrikanth Jadhav Dr. M.Karuthapandi & Smt. Sk. Rehanuma Sulthana
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	To study the faunal diversity of Amrabad and Kawal Tiger Reserve of Telangana.

Progress:

Three surveys have been conducted. A total of 13580 faunal samples of various groups have been collected of which 6973 specimens from Kawal Tiger Reserve and 6607 from Amrabad Tiger Reserve.

Significant findings:

Macaca mulatta troops were observed in many locations in both the tiger reserves, but *Macaca radiata* was observed in only one location in Amrabad tiger reserve. Also approximately 54 species of birds were observed in Kawal tiger reserve and 62 species in Amrabad tiger reserve.

Heterometrus swammerdami Simon, 1872



05

Taxonomic studies on
freshwater Ostracods
of Eastern Ghats, India



Stenocypris hislopi (Ferguson, 1969)

Investigator:	Dr. M. Karuthapandi
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	Taxonomic studies on freshwater Ostracods of Eastern Ghats.

Progress:

Two surveys were conducted for freshwater ostracods and other freshwater faunal components. A total of 3122 specimens comprising aquatic hemiptera, coleoptera, freshwater crabs, prawns, mollusca, fishes and other insects were collected. 49 containers of wet collections of Ostracods and Zooplankton were also collected. 2037 specimens identified belonging to 20 species of ostracods, 09 cladocerans, 04 calanoid copepods, 01 branchipods, 02 freshwater Crab, 11 rotifera, 23 mollusca, 05 aquatic hemiptera, 08 aquatic coleoptera, 19 butterflies and 23 fishes.

WESTERN
GHATS
REGIONAL
CENTRE
(WGRC),
KOZHIKODE

Grassland Ecosystem:
Survey and
documentation of
faunal resources of
Shola Grasslands of
Western Ghats-
Phase-1

01

Coordinator:	Dr. P.M. Sureshan
Investigators:	Dr. K.G. Emiliyamma Dr. K. Rajmohana Dr. B.H.C.K. Murthy Dr. P. Girish Kumar Dr. Md. Jafer Palot
Period:	April 2014 to March 2017
Status:	Completed
Objectives:	To identify and inventorise the fauna of Shola Grassland ecosystem of Western Ghats.

Outcome:

Major sholas of Southern Western Ghats (Kerala) surveyed. The study includes chapters on Invertebrata: Hymenoptera (Pteromalidae, Platygastriidae, Diapriidae and Vespidae), Collembola, Mantodea, Odonata, Dermaptera, Lepidoptera (Rhopalocera), Arachnida: Scorpiones, Spiders, Chilopoda: Centipedes, Crustacea (Freshwater Crabs), Mollusca, and Vertebrata (Pisces, Amphibia, Reptilia, Aves and Mammalia).Total number of 990 species have been recorded (351 species invertebrate and 639 species of vertebrates).

Interstesting findings include 13 new species, 7 species new record to India, 5 new distributional records and 165 species endemic to Westren Ghats.

Grassland Ecosystem : Anamudi



02

Tropical Rainforests-
Western Ghats,
Kerala

Cooordinator:	Officer-in-Charge
Investigators:	Subject Experts
Period:	April 2015 to March 2017
Status:	Completed
Objectives:	To identify and inventories the fauna of the tropical rain forests of Kerala part of Western Ghats.

Outcome:
The study recorded a total of 3516 species including 5 faunal groups of Vertebrates comprising 1001 species (Pisces, Amphibian, Reptilian, Aves & Mammalia) and 17 groups of Invertebrate comprising 2515 species (Protozoa, Chilopoda, Annelida, Arachnida, Hymenoptera, Odonata, Hemiptera, Mantodea, Lepidoptera, Ephemeroptera, Phasmodea, Diptera, Orthoptera, Dermaptera, Isoptera, Crustacea and Coleoptera).

Significant findings:
Five species have been described as new to science, 5 new records to India, 3 new distributional records from Kerala, while 403 species have been found as Endemic to Western Ghats (83 species belonging to invertebrates and 320 speceies belonging to vertebrates).

Melanobatrachus indicus Beddome, 1878



03

Agroecosystem:
Rice Ecosystems of
Kerala-Phase 1

Investigators:	Dr. P.M. Sureshan Dr. K.G. Emiliyamma Dr. K. Rajmohana Dr. B.H.C.K. Murthy Dr. P. Girish Kumar Dr. Md. Jafer Palot
Period:	April 2015 to March 2018
Status:	Ongoing
Objectives :	To study and inventorize the fauna of Rice ecosystems of Kerala.

Progress:
Several local surveys conducted to the various rice ecosystems of Kozhikode, Kannur, Malappuram and Wayanad districts and collected various faunal groups. Identified 22 species of Pteromalidae, 21 of Vespidae, 9 of Sphecidae, 6 of Scoliidae, 5 of Eucharitidae (Hymenoptera), 54 of spiders and 18 species of Odonata.

Significant findings:
Two male morphs of spiders [*Thomisus keralae* Biswas & Roy and *Oxytate elongata* (Tikader)] have been recorded for the first time from India.

04

Fauna of India: Family
Vespidae (Insecta:
Hymenoptera)

Investigators:	Dr. Girish Kumar, P. & Dr. P.M. Sureshan
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	To prepare Fauna of India volume on Family Vespidae.

Progress :
Three extensive surveys were conducted. 2450 specimens of representative faunal samples including wasps were collected. Significant findings: 14 species of vespid wasps are new records to Goa state. In addition to this, a new species of Eucharitid wasp, namely, *Stilbula venkataramani* Girish Kumar and a new species of velvet ant are also described.

ESTUARINE
BIOLOGY
REGIONAL
CENTRE
GOPALPUR-
ON-SEA
(EBRC),
ORISSA

01

Current Status of
Faunal Diversity of
Rushikulya Estuary

Investigators:	Dr. Anil Mohapatra & Dr. Aftab Ahmad
Period:	April 2016 to March 2019
Status:	Ongoing
Objective:	To study the current Status of Faunal Diversity of Rushikulya estuary

Progress:
A total of 4075 specimens were collected from surveys comprising Crustacea, Insecta, Annelida, Mollusca and Pisces.

Identification include 92 species of Pisces, 50 species of aquatic Insects, 22 of Crustacea and 66 species of Mollusca.

02

Faunal Diversity of
Tampara Lake,
Chhatrapur,
Ganjam, Odisha

Investigators:	Dr. A. Mohapatra Shri A. Mahapatra Dr. Aftab Ahmad, Dr. B. Tripathy & Shri S.S. Mishra
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	Comprehensive study of all the faunal groups of Tampara Lake

Progress:
1370 specimens were collected from local surveys comprising Crustacea, aquatic and terrestrial spiders, aquatic Hemiptera, aquatic Coleoptera, Mollusca and Pisces. Identification include 7 species of aquatic Insects, 7 species of Mollusca, 13 species of Fishes and one species of Ampbhibia.

03

Faunal diversity of
Dhamra Estuary,
Odisha

Investigators:	Dr. Anil Mohapatra Dr. Aftab Ahmad Dr. Basudev Tripathy Shri S.S. Mishra & Shri Prasad Chandra Tudu
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	To study the faunal diversity of Dhamra Estuary, Odisha.

Progress:
Two surveys were conducted. Faunal collection include Sea pen, Sponge, Polychaete, aquatic Insects, Crabs, Hermit Crabs, Horseshoe Crabs, Prawn, parasitic Isopods, Stomatopods, Gastropods, Bivalves, Sepia, Lolligo, Seastar, Sea Urchin, Sea cucumber, Fishes, Beetles and Isopoda.

Identification include 2 species of Horseshoe Crabs, one each species of Star fish and Sea cucumber, 7 of Crabs, 33 of Gastropods, 55 of Bivalves and 31 species of Fishes.

Portunus sanguinolentus (Herbst, 1783)



ARUNACHAL
PRADESH
REGIONAL
CENTRE
(APRC),
ITANAGAR

01

Fauna of

Eastern Himalayas-

Amphibians of

Arunachal Pradesh

Investigators:	Dr. B. Sinha & Sh. B. Saikia
Period:	April 2016 to March 2018
Status:	Completed
Objective:	To study the biodiversity and zoogeographic distribution of amphibians of Arunachal Himalayas.

Outcome:
On the basis of extensive surveys conducted in different parts of state for two years, a total of 111 specimens of amphibians were collected. Besides 379 backlog amphibians specimens in the APRC/ZSI were also studied. A total 79 species under 33 genera, 9 families and all the 3 living orders were found to be present in the state. 76 species of anurans, 1 species of caudata and 2 species of gymnophiona recorded. One new species (*Odorrana arunachalensis*), 4 new records to India, 8 new State Records and 4 Second records of amphibians were also delivered as part of this study.

Megophrys pachyproctus Huang, 1981



Faunal Diversity of

Mehao Forest Reserve,

Arunachal Pradesh

02



Hoolock leuconedys (Groves, 1967)

Investigators:	Dr. S. D. Gurumayum Dr. L. Kosygin Singh & Dr. B. Sinha
Period:	April 2016 to March 2019
Status:	Completed
Objective:	To inventorise the faunal diversity of Mehao WildLife Sanctuary, Arunachal Pradesh w.s.r to Fish, Amphibia, Mollusca and Zooplankton.

Outcome:
The topography of the Sanctuary is mainly hilly, with tropical evergreen forests. Peaks above 2,000 m experience snowfall and the Sanctuary form a part of the catchment area of the Brahmaputra river. There are two major lakes inside, Mehao and Sally. On the basis of extensive surveys conducted in different parts of the sanctuary, a total of 5327 faunal specimens collected from more than 30 different locations. A total of 271 faunal species of both invertebrates (133) and vertebrates (138) were recorded during the survey. Among vertebrates total of 45 fish species, 12 species of amphibian, 15 species of reptiles, 56 species of birds and 10 species of mammals were recorded. Among invertebrates, 36 species of butterflies, 5 species freshwater crabs, 4 species of scorpions, 3 species of prawns, 21 species of cladoceras, 10 species of freshwater and 54 species of terrestrial mollusca have been reported.

03

Fauna of Talle Valley
Wildlife Sanctuary,
Eastern Himalayas

Investigators:	Dr. B. Sinha, Dr. S. D. Gurumayum & Dr. L. Kosygin Singh
Period:	April 2015 to March 2018
Status:	Completed
Objective:	To document biodiversity of selected faunal groups of Talle Valley Wildlife Sanctuary in the Eastern Himalayas of India.

Outcome:
Talle Valley Wildlife Sanctuary is one of the undisturbed pristine climax vegetation in Arunachal Pradesh and home to the rare, elusive and graceful clouded leopard, *Neofelis nebulosa*. The terrain of the sanctuary falls under the Talle Plateau with plains, valleys and hills. On the basis of extensive surveys for three years conducted in different parts of the sanctuary, representative faunal specimens were collected and include 54 species of Protozoa, 134 of Lepidoptera, 41 of fishes, 24 of amphibians, 52 of reptiles, 265 of Birds and 46 species of Mammals. Five new species, 22 new India record and 36 new record for Arunachal Pradesh have also been documented.

Tamoips macclellandi (Horsfield, 1840)



04

Fauna of Dihang-Dibang
Biosphere Reserve,
Arunachal Pradesh
(Combined programme)



Dihang- Dibang Biosphere Reserve Expedition team

Investigators:	Dr. B. Sinha & Scientists from HQ & RCs
Period:	April 2015 to March 2019
Status:	Ongoing
Objective:	To explore the faunal diversity of Dihang-Dibang Biosphere Reserve in Arunachal Himalayas.

Progress:
Expedition undertaken with the participation of scientists and staff from APRC, Itanagar, NERC, Shillong, SRC, Chennai, WGRC, Calicut, WRC, Pune, NRC, Dehradun and ZSI, HQ, Kolkata. Results as of now indicates record of 35 species of mammals, 105 species of birds. Identification of other groups under process.

05

Faunal inventORIZATION
of land snails of
Arunachal Pradesh

Investigators:	Dr. S.D. Gurumayum, Dr. B. Sinha, Dr. Basudev Tripathy & Shri. S.K. Mukhopadhyay
Period:	April 2018 to March 2021
Status:	Initiated
Objective:	To inventories the land snails of Arunachal Pradesh.

Progress:
Two extensive surveys and 17 local surveys
conducted. A total of 2527 faunal specimens were
collected. Identification include 51 species of
Gastropoda and 36 species of Pisces.

06

Study of millipedes
(Myriapoda: Diplopoda)
distribution in Lower
Subansiri & Papum
Pare district of
Arunachal Pradesh

Investigator:	Dr. Temjenmongla
Period:	April 2018 to March 2021
Status:	initiated
Objective:	To study the distribution of millipedes (Myriapoda: Diplopoda) in Lower Subansiri and Papum Pare district, Arunachal Pradesh.

Progress:
Two surveys conducted, 826 faunal specimens
collected. Identification include one species each of
Blattodea, Hymenoptera, Odonata, 2 species of
Coleoptera, 21 species of Lepidoptera, one species
of Ampbhibia, 2 of Reptilia and one species of
Mammalia.

Survey localities



MARINE AQUARIUM & REGIONAL CENTRE (MARC), DIGHA

Distribution, Diversity and Taxonomy of the Zooplankton from the Digha Coast, East Coast of India.

01

Investigator:	Dr. S. Balakrishnan
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To study and inventorise the Zooplankton from the Digha coast.

Progress:

Total 12 days local surveys have been conducted in marine mangrove, estuarine, mudflat and intertidal ecosystems of Digha Coast. Collected 1116 specimens belonging Mollusca, Sea urchin, Crab, Fishes, Polychaete, Isopod, Prawn, plankton sample and Brachiopoda. Identification include 25 species of Fishes, 11 species of Mollusca, 6 species of Echinodermata, 3 species of Copepoda, 1 species Cnidaria, 1 species of Annelida and 1 species of Brachiopoda.

Pythia plicata (Férussac, 1821)



02

Diversity and Distribution
of Octocorals and
associated fauna along
the Digha coast of India

Investigator:	Dr. J.S. Yogesh Kumar
Period:	April 2017 to March 2020
Status:	Ongoing
Objective:	To determine the species diversity and abundance of Octocorals and associated faunal community along the Digha coast of India.

Progress:

Total 18 days local surveys have been conducted along Digha coast and collected 1437 number of specimens and identified 890 specimens which include 106 species of fishes, 36 species of molluscs, 14 species of crustaceans, 3 species of soft corals, 2 species of sea pens and one species each of Actiniaria, Scyphozoa, Hydrozoa, sea cucumber, sea star and sea urchin from Digha coast.



Pteroeides punctatum
Thomson & Simpson, 1909



10

**EXTERNALLY
FUNDED
PROJECTS**

- Besides departmental programmes, ZSI scientists were also engaged in 27 externally funded projects. The Funding Agencies include:
- Department of Science and Technology, Lakshadweep
- Ministry of Environment, Forest and Climate Change, New Delhi
- All India Co-ordinated Project on Taxonomy (AICOPTAX), MoEFCC, New Delhi
- National Mission on Himalayan Studies, (NMHS) MoEF&CC, New Delhi
- Department of Science & Technology (DST-SERB), Govt. of India, New Delhi
- DST INSPIRE Faculty AWARD, Govt. of India, New Delhi
- West Bengal Biodiversity Board, Kolkata
- Department of Environment Forest and Climate Change, Govt. of Bihar
- M/s. GHCL Ltd., Ahmedabad
- Jharkhand Biodiversity Board, Ranchi, Jharkhand
- Biodiversity Project, Department of Forest, Government of West Bengal

01

River Dolphin
Conservation under
Green Skill
Development
Program (GSDP)

Funding Agency:	Ministry of Environment, Forests & Climate Change, New Delhi.
Investigator:	Dr. Gopal Sharma
Period:	April 2018 to March 2019
Sanctioned at	GPRC, ZSI-Patna
Status:	Completed
Objective:	To create awareness for the Conservation of River Dolphin under Green Skill Development Program (GSDP).

Outcome:
Two training programmes were conducted to create awareness for the conservation of River Dolphin.

GSDP-I: 15 days training Programme was organized on Conservation of Gangetic dolphin. 20 candidates participated as volunteers cum trainees along with a master trainer.

GSDP-II: The second segment of the Green Skill Development Programme (GSDP) was organized and 22 candidates participated. The GSDP-II was launched by the MoEFCC, Government of India, as a broad training event for the candidates from all over the country. These training programmes were based on the measures of conservation and fundamental facts related to Gangetic dolphin (*Platanista gangetica*). Training was launched by the government to create skilled work force in India with special purpose to provide the carrier opportunities in the field of conservation science and taxonomy. Different experts from universities, research institutes and the civil society were invited to deliver lecture.

River Dolpin Survey team



02

Preparation of
Vikramshila Gangetic
Dolphin Sanctuary
Management Plan



Bihar State Forest Officilas during Report Presentation

Funding Agency:	Department of Environment Forest and Climate Change, Govt. of Bihar.
Investigator:	Dr Gopal Sharma
Period:	April 2018 to March 2019
Sanctioned at:	GPRC, ZSI-Patna
Status:	Completed
Objective:	To prepare management plan of Vikramshila Gangetic Dolphin Sanctuary.

Outcome:
The Vikramshila Gangetic Dolphin Sanctuary Management Plan is the second management plan for this protected area, and the first prepared based on scientifically collected and appraised information on all the aspects related with the mandate and objectives of this sanctuary. This management plan is effective to the extent its prescriptions are completely, consistently and efficiently followed and suggestions earnestly pursued. It is expected that the Bhagalpur Forest Division with the guidance and support of all concerned and patronage of government shall make best use of this VGDS Management Plan in fast tracking the dolphin conservation in Ganga in the VGDS landscape, putting back their population on track of recovery and spread to adjoining river areas, and also exemplify impactful rejuvenation of river Ganga in Bhagalpur segment.

03

Population Estimation and Assessment of Gangetic Dolphin from Buxar to Mokama in Bihar (Ganga main stem- 275km)

Funding Agency:	Department of Environment and Forest and Climate Change, Govt. of Bihar.
Investigator:	Dr. Gopal Sharma
Period:	April 2018 to April 2019
Sanctioned at:	GPRC, ZSI- Patna
Status:	Completed
Objective:	To find out the number of dolphin in the rivers of Bihar.

Outcome:

Altogether 333 dolphins were recorded in the 298 km stretch of river Ganga from Chausa to Mokama. For the first time census and status survey of Gangetic Dolphin was started in the rivers of Bihar to check the variation of numbers of dolphin in the different segments.



Survey team

04

Status survey and Conservation plan for sea turtles of Mandvi coast, District Kutch, Gujarat

Funding Agency:	M/s. GHCL Ltd., Ahmedabad
Principal Investigator:	Dr. Kailash Chandra,
Co-Principal Investigator:	Dr. Basudev Tripathy
Period:	September 2018 - March 2019
Sanctioned at:	HQ, ZSI-Kolkata
Status:	Completed

Objectives:

- Survey on the status of breeding / nesting ground of sea turtles at the project location.
- Recommendation for action plan for conservation of sea turtle in the project location.

Outcome:

Daily monitoring was done from September 2018 - March 2019, no sea turtle nest / fresh crawl marks were observed along the shore/beach surveyed. However, secondary sources of information revealed the coastline of Mandvi about 20 km form proposed site as important sea turtle nesting habitat along Kutch. It was observed that due to its narrow beach width, vegetation cover, slope, presence of pebbles and rubbles and presence of predators on the beach sea turtles may not be favouring this area for laying eggs. However the 7 km stretch between Rukmavati river mouth (about 20 km from proposed project site) and Mandvi palace (about 16 km from project site) is sandy, vegetation to HTL is wide and much of the sporadic nesting could be taking place along this coastal stretch. Though sea turtle nesting at the project location seems to be rare and low probability, however considering that Mandvi beach seems to be an important sporadic sea turtle nesting site of Kutch and therefore conservation plans as per suggestions of ZSI should be implemented.

05

Long Term
Monitoring of
Coral reefs of
Lakshadweep

Funding Agency:	Department of Science and Technology, Lakshadweep
Investigator:	Dr. Rajkumar Rajan
Period:	November 2015 to October 2025
Sanctioned at:	MBRC, ZSI- Chennai
Status:	Ongoing
Objective:	Long term Monitoring of Coral reefs of Lakshadweep.

Progress:

Mapping of Lakshadweep reefs:

Baseline maps have been prepared from the NRSC images for Baliyapaniyam, Cheriyananiyam, Bitra, Bangaram, Agatti, Suhelipar, Cheriyan-Kalpeni Chetlat, Kiltan, Kadmat and Minicoy atolls, for ground truthing.

Monitoring reef health:

Reefs in Minicoy, Kalpeni, Agatti, Kadmat, and Bangaram Islands were covered for gathering data on the monitoring parameters, including bleaching recovery assessment, using LIT assisted quadrat surveys. 4 stations each were sampled at Kalpeni, Agatti, Kadmat, and Bangaram Islands and 6 stations were sampled in Minicoy Island.

Assessment of coral diseases:

Three surveys have been undertaken for the assessment of prevalence of diseases in corals in Kavaratti Island.

Zooxanthellae studies:

Three surveys have been undertaken under the zooxanthellae variability assessment. Samples were collected from coral colonies for zooxanthellate identification and density, and the colonies were tagged for monitoring susceptibility to bleaching.

Studies on restoration of reefs based on Questionnaire were done.

Studies on coral spawning

Coral spawning was observed for the second consecutive year in Lakshadweep in February 2019.

06

Lepidoptera (Insecta)
as potential Indicator-
Taxa for tracking
Climate Change in
the Indian Himalayan
Landscape"

Funding Agency:	NMHS, MoEF & CC
Principal Investigator:	Dr. Kailash Chandra
Co-Investigator:	Dr. Vikas Kumar
Period:	March 2016 to March 2019
Sanctioned at	HQ, ZSI- Kolkata
Status:	Ongoing

Objectives:

- To investigate the differential processes influencing the diversity and distribution pattern of Lepidoptera assemblages (moths and butterflies) in six Protected Areas of Indian Himalayan Landscape.
- Repeating monitoring surveys in historical collection localities originally carried out by earlier workers, and generating current species-distribution map from primary as well as secondary data.
- To evaluate status and distribution of threatened Apollo and other Parnassinae butterflies and preparing habitat suitability map.
- To compare genetic distinctness of Lepidopteran species commonly occurring in Western, Central and Eastern Himalaya through DNA Barcoding and to resolve species complexes and cryptic species.

Progress:

Field sampling was conducted during 2016-19 in the above-mentioned Protected Areas of IHR. During the tenure, 175 LTEM plots were established covering a complete altitudinal gradient across IHR, which represented 30 different vegetation types. Altogether 10,092 individuals of Lepidoptera were encountered, revealing 484 species of butterflies under 222 genera of 6 families and 1,274 species of moths under 704 genera of 25 families.

During 2018-19, four new species of moths have been described: Besides, the study reported 1

species of butterfly and 99 species of moths novel to the Indian fauna. Maximum number of new country records were revealed from Ladakh and Dihang-Dibang Biosphere Reserve with 22 species, followed by 13 species each from Askot WLS and Neora Valley NP and with 10 species each from Great Himalayan and Namdapha NP. Significant range extensions for several species were documented, in both altitudinal and geographical expanse. The study reflected eight species of moths showing restricted distribution in specialized habitat of Alpine Pastures over 3500 m altitude. These species, due to their habitat stringency, are highly sensitive to any subtle alterations in the habitat and thus, may be monitored for a time period to evaluate climate change impacts on Himalayan biodiversity. A total of 1019 DNA barcode sequences of Himalayan Lepidoptera have been generated and submitted in BOLD Database of which 539 sequences are submitted during 2018-2019.

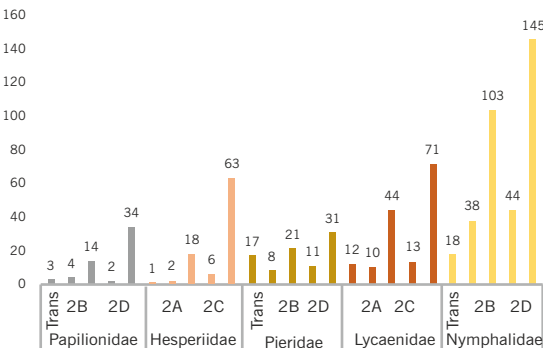


Figure : Richness of Butterfly families recorded in different Himalayan Provinces

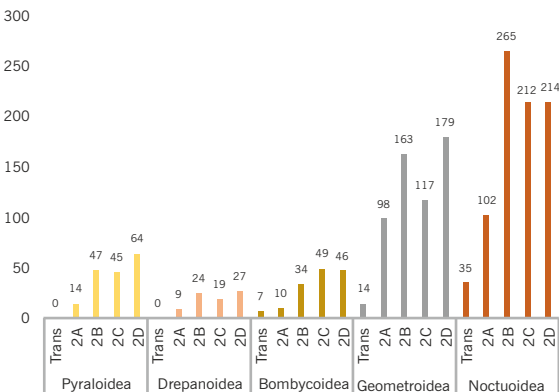


Figure : Richness of Moth Superfamilies recorded in different Himalayan Provinces

Biodiversity Assessment through Long-term monitoring plots in the Indian Himalayan Landscape

07

Funding Agency:	NMHS, MoEF&CC
Principal Investigator:	Dr. Kailash Chandra
Co-Investigator:	Dr. Vikas Kumar
Period :	March 2016 to March 2019
Sanctioned at:	HQ, ZSI- Kolkata
Status:	Ongoing

Objectives:

- To create a geospatial and genetic database on the fauna of Himalaya and the Climate- change-induced impact on faunal diversity of the region.
- To establish long-term faunal diversity monitoring plots across the Himalayan Region.
- To develop long-term monitoring protocols for selected indicator taxa in the Region.
- To develop local level capacity building among students, teachers and NGO's in long- term monitoring through training programmes and publications

Progress:

Around 15,000 samples of different animal taxa has been collected from Himalayan landscape. Morphological identification of around 7000 specimens is completed and more than 1800 samples are processed for DNA barcoding. These studies with combined morphological and molecular data will shed light for climate change.

Landscape view of survey area



08

Taxonomic study of Tettigoniidae (Orthoptera) of India

Funding Agency: All India Co-ordinated Project on Taxonomy (AICOPTAX), MoEF&CC

Investigator: Dr. D. Suresh Chand

Period: December 2016 to November 2019

Sanctioned at: HQ, ZSI- Kolkata

Status: Ongoing

Objective: Taxonomic study of Tettigoniidae (Orthoptera) of India.

Progress:

Tettigoniidae survey was made in different habitats from all the three states, viz., forestlands, arablelands, grasslands and wastelands falling under different agro climatic zones of West Bengal, Jharkhand, and Odisha. 19 species of Tettigoniidae belonging to 5 different subfamilies viz., Conocephalinae, Mecopodinae, Phaneropterinae, Hexacentrinae and Pseudophyllinae were identified. During the survey period, 19 species were observed and collected from West Bengal, Jharkhand and

Euconocephalus pallidus (Redtenbacher, 1891)



09

Studies on the moth fauna of Pachmarhi Biosphere Reserve - an assessment of the species richness, relative abundance and distribution as environmental indicators

Funding Agency: MoEF&CC

Investigator: Dr. S. Sambath

Period: June 2016 to May 2019

Sanctioned at: CZRC, ZSI- Jabalpur

Status: Ongoing

Objectives:

- To determine the species composition and relative abundance of moth population across different season and habitat in Pachmarhi Biosphere Reserve.
- To determine the microhabitat associations, host plant relationships and to relate moth species composition to vegetation across the different habitat.
- To prepare the distribution map of the moth fauna using GIS techniques.

Progress:

During the period, one survey was undertaken from Bori Wildlife Sanctuary and Satpura Tiger Reserve (Madhai Region) and collected 479 specimens of 10 faunal groups. 280 specimens of moth belonging to 54 species and 46 genera in 12 families were identified and registered.

Significant finding:

Five species of Moths (Lepidoptera) were added to the moths fauna of Pachmarhi Biosphere Reserve

10

Genetic management
of captive Red Panda
(*Ailurus fulgens*)
populations in
India: implications in
conservation breeding
and reintroduction
programmes

Funding Agency:	DST SERB, Govt. of India, New Delhi
Investigator:	Dr. Lalit Kumar Sharma
Period:	July 2016 to June 2019
Sanctioned at	HQ, ZSI-Kolkata
Status:	Ongoing

Objectives:

- To evaluate the current status and distribution of Red Panda in the state of West Bengal and Sikkim.
- To assess the level of existing genetic diversity, extent of inbreeding and effective number of breeders in the captive population of Red Panda at Himalayan Zoological Parks of Darjeeling and Gangtok.
- To establish pedigree and kinship relationship among the captive individuals for planning mating and monitoring genetic diversity.
- To assess the population genetic structure and the bottleneck footprints, if present in the captive population of Red Panda at Himalayan Zoological Parks of Darjeeling and Gangtok.
- To propose a management plan for monitoring Red Panda population for long term stability in Darjeeling and Gantok Zoo and selection of individuals for release in wild.
- To identify the effective sites/locations in West Bengal and Sikkim where the red panda can be released.

Progress:

The Species distribution modelling was carried out for Singalila National Park and Neuora Valley National Park for identifying and mapping red panda habitats with AUC = 0.989. For understanding the

genetic configuration of the captive population of red panda of Himalayan Zoological Parks of Darjeeling and Gangtok. Standardization of the PCR and sequencing has been carried out for screening the microsatellite markers which will be used for the analysis. Genetic analysis of the captive individuals was carried out. All collected samples from captivity were processed for DNA extraction and genotyping with 9 red panda specific microsatellites. Genetic analysis from the non-invasive samples collected from wild was carried out. The observed ADO (?1) and FA (?2) error rates were varied across loci. ADO range from 0 (RP240 and Aifu 01) to 0.477 (RP260) and FA varies from 0.025 to 0.70. Locus wise estimated probability of identity among unrelated individuals (PID) and siblings (PID sibs) ranged from 0.10-0.27 and 0.40-0.55 respectively. The estimated cumulative probability of identity (PID cumulative) of the selected panel was 1.6×10-6. Using the selected panel of seven loci, we identified 20 unique genotypes among 30 genotype data from Sikkim and west Bengal and used for the further genetic analysis. After individualization with selected panel, we applied all nine microsatellite data (with amplification success >90 %) for population genetic analysis. Mean value of null alleles observed 0.155 and varied from -0.046 to 0.470. Few loci (RP357, RP385, RP409 and RP 367) were showing high frequencies of null alleles compared to other loci and consequently affected the HWE and FIS significantly. Genetic diversity and inbreeding was assessed using the collected samples. All the nine amplified microsatellite loci were polymorphic with number of allele per locus ranges from 3 (RP 381) to 9 (RP 409), and mean number of observed alleles (MNA) was 5.44. HO and HE values varied from 0.250-0.800 and 0.552-0.765, respectively with mean value of HO=0.493 and HE=0.666. Among nine loci used in the present study, three loci (RP357, RP385 & RP367) were significantly deviated from HWE after Bonferroni correction. Only one pair of loci out of 36 pairwise comparisons was in significant linkage disequilibrium (P<0.0012) after Bonferroni Holm method correction. Therefore we took all the 9 loci for genetic analysis. FIS value ranged from -0.026 (RP 260) to 0.648 (RP 357) and mean value was 0.269 which indicates significant level of inbreeding.

11

Seasonal Dynamics of
Microzooplankton
and their trophic role
in the pelagic food web
of the Northern Coastal
waters of Bay of Bengal

Funding Agency:	Department of Science & Technology (SERB), New Delhi
Investigator:	Dr. Jasmine.P
Period:	October 2017 to September 2020
Sanctioned at:	HQ, ZSI- Kolkata
Status:	Completed

Objectives:

- Spatio-temporal variation of microzooplankton diversity along the coastal waters of northern Bay of Bengal.
- Role of microzooplankton in the pelagic food web and their inter relationship with different trophic levels of the ecosystem.
- To assess the impact of episodic events on the community structure of microzooplankton and the role in the biogeochemistry of coastal waters of Bay of Bengal.
- To compare the temporal dynamics of the ciliate colonizations between different water depths and also to find out the indicator taxa for monitoring water quality in coastal waters
- To create a taxonomic database of the coastal ciliate communities

Progress:

Three seasonal coastal surveys were conducted all along the coastal waters of Bay of Bengal from 21°N to 16°N, i.e., from West Bengal, Paradip, Gopalpur, Vishakapatnam, Bheemulipatnam, Kakkinada. The data analysis of the microzooplankton samples resulted in taxonomic groups representing Ciliates, Dinoflagellates, Foraminiferans, Radiolarians, and other larval forms. The major abundant groups are Ciliates and Dinoflagellates. A total of 92 species of Ciliates and 112 species of Dinoflagellates have been identified. There was a significant Spatio-temporal variation of microzooplankton communities all along the coast were recorded. The highest microzooplankton

abundance in surface water has been recorded from Sagar Island, compared to other stations. The highest microzooplankton abundance in the deeper depths was recorded from Paradip. The abundance of microzooplankton was decreasing from the coastal stations with lower depth to the deeper depth stations. Along the east coast, the mean abundance of ciliates decreases gradually from North to south (21°N - 16°N). Ciliates and dinoflagellates had the highest abundance in Sagar Islands, whereas foraminiferans and radiolarians highest abundance in Kakinada and Bheemulipatnam respectively. Copepod was the most abundant group among all the study stations followed by gastropods (9%), Chaetognatha (6%), Hydromedusae (5%), Siphonophore (4%), Cladocera (1%). Fishes from every 50m depth stations by trawl net, which has given a clear interlink between the primary to tertiary level community structure and helped to delineate how the micro species level shift influence the fishery communities in the coastal waters of Bay of Bengal.

An unusual swarm of gelatinous zooplankton, *Pleurobrachia pileus* was recorded in the Sundarban, during the winter monsoon, which in turn diminished the population of other zooplankton and fishes. *Beroe gracilis* Künne, 1939 is a new record from the Bay of Bengal, Northern Indian Ocean. The phenomenon of Epibiosis was also recorded among plankton in the coastal waters of Andhra Pradesh and Odisha during winter monsoon. Among mesozooplankton, Pteropoda, checklist of World Ocean was also prepared with 146 species of which 138 species are recognized as valid and are distributed among 35 genera, 12 families, 3 nomen dubium, and 5 taxon inquirendae. Out of 146 species, 71 species are from suborder Euthecostomata, 23 species from Pseudothecosomata, and rest of the 52 species are from suborder Gymnosomata. To achieve the database development of coastal microzooplankton, a total of 92 species of Ciliates and 112 species of Dinoflagellates have been identified from the present study.

12

Diversity, Distribution
and Status of
Freshwater Fishes
of Jaldhaka River,
West Bengal, India

Funding Agency:	West Bengal Biodiversity Board
Investigator:	Dr. L.K.Singh
Period:	June 2017 to May 2019
Sanctioned at:	HQ, ZSI- Kolkata
Status:	Ongoing
Objectives:	To study the diversity, distribution pattern and status of freshwater fishes of Jaldhaka River, West Bengal.

Progress:
Three faunistic surveys undertaken and more than 520 specimens of freshwater fishes were collected. Identified 14 species of fishes belonging to 17 genera and 6 families.

13

Taxonomic studies
on the Tubulifera
(Insecta:Thysanoptera)
of India

Funding Agency:	All India Co-ordinated Project on Taxonomy (AICOPTAX), MoEFCC
Investigator:	Vikas Kumar
Period:	April 2017 to March 2020
Sanctioned at:	HQ, ZSI- Kolkata
Status:	Ongoing
Objective:	Taxonomic studies on the Tubulifera (Insecta: Thysanoptera) of India

Progress:
Two Surveys, one each in Gujarat and Odisha State of India have been conducted. A total of 40 species have been identified and barcoded, which revealed a number of cryptic species in at least five thrips species. Data analysis is in progress. About 25 new

14

Faunal Assessment of
Dalma WLS & Saranda
Forest Division,
Jharkhand

Funding Agency:	Jharkhand Biodiversity Board Ranchi, Jharkhand
Principal Investigator:	Dr. Kailash Chandra
Co-Investigator:	Dr. Gopal Sharma & Dr. Navneet Singh
Period:	April 2017 to September 2019
Sanctioned at:	HQ, ZSI- Kolkata
Status:	Ongoing
Objectives:	Faunal diversity assessment of Dalma WLS & Saranda Forest Division, Jharkhand and publication in separate volume of both the WLSs.

Progress:
40 species of Gastropods/Bivalves, 2 species of Chilopoda, 4 species of Arachnida (Araneae), 5 species of Crustacea, 110 species of Zooplanktons, 15 species of Reptiles, 17 species of Amphibian were identified. 18 species of Mammals and 70 species of birds were observed in DWLS. 348 species of Lepidoptera, 40 species of Coleopteran, 8 species of Hemiptera, 20 species of Odonata, 9 species of Orthoptera ,6 species of Mantodea and 2 species of Blattodea were identified and 20 species of birds were observed in Saranda Forest Division.

Eublepharis hardwickii Gray,1827



15

Taxonomic studies
on family Nolidae
(Lepidoptera) from
North East India

Funding Agency:	DST-SERB Ministry of Science and Technology, Govt of India.
Investigator:	Dr. Rahul Joshi
Period:	December 2018 to December 2021
Sanctioned at:	GPRC, ZSI-Patna
Status:	Ongoing

Objectives:

- To undertake intensive and extensive survey tours to different/unexplored areas of North East India for the collection of adult Nolid moths.
- To identify the collected species of family Nolidae and assign them to various taxa by incorporating the species specific characters of male and female genitalia.
- To study diversity of family Nolidae from North East India and to describe new taxa, if any.
- To provide a comprehensive Checklist of family Nolidae from North East India.
- To work out zoogeographical affinities of studied taxa based on data with adjoining areas/ regions.

Progress:

One JRF joined on 5th February 2019. JRF is learning techniques of collection, preservation and stretching of moths. Survey will start from May 2019. Significant Achievements: A checklist of subfamily Nolinae (Lepidoptera) from India has been accepted for publication.

Sinna calospila Walker, 1865



Torleya nepalica Allen & Edmunds, 1963

Biosystematics of
Mayflies (Insecta:
Ephemeroptera)
of India

16

Funding Agency:	All India Co-ordinated Project on Taxonomy (AICOPTAX), MoEFCC
Investigator:	Dr. K.A. Subramanian
Period:	April 2017 to March 2020
Sanctioned at:	SRC, ZSI- Chennai
Status:	Ongoing

Objectives :

- Study on the biosystematics of families Leptophlebiidae, Ephemeridae, Hepatageniidae and Baetidae (Insecta: Order Ephemeroptera)
- Taxonomical description and identification of diagnostic characters of the larval and adult stages of species of above mentioned families
- Study on the patterns of distribution of the species within India
- Capacity building among students on Ephemeroptera Taxonomy by conducting trainings and workshops
- Development of online internet resources for Ephemeroptera of India.

Progress:

Completed 62 days of field surveys in Western Ghats, Central India,Eastern Himalaya and Andaman and Nicobar islands.Taxonomic study and digitization of 30 species completed.65 Species, 36 Genera and 9 Families identified from field surveys and NationalZoological Collections.Described 8 new species to science.Identified 10 species as new records to IndiaTen species collected after a gap of 50 years.Standardized protocol for DNA extraction

17

Conservation of Red Panda (*Ailurus fulgens*) in Eastern Himalayas: evaluating distribution, population status and conservation genetics for long term management and implication in conservation

Funding Agency:	DST INSPIRE Faculty AWARD, Govt. of India, New Delhi
Investigator:	Dr. Mukesh Thakur
Period:	April 2017 to March 2020
Sanctioned at:	HQ, ZSI- Kolkata
Status:	Ongoing
Objectives:	Evaluating distribution, population status and conservation genetics for long term management and implication in conservation of Red Panda (<i>Ailurus fulgens</i>)

Progress:

Field surveys: 5 field tour undertaken.
 Area Covered: Sikkim and West Bengal (WB): West Sikkim: Barsey Rhododendron Sanctuary, South Sikkim: Maenam Wildlife Sanctuary, East Sikkim: Knyongnosla Alpine Sanctuary and Pangolala Wildlife Sanctuary
 Darjeeling District (WB): Singalila National Park and Neora Valley National Park
 Total evidences/ Locations: 82
 Area Covered: Tawang District of Arunachal Pradesh (AP)
 Pangchen Muchot Lumpo Community Conservation Area Pangchen Lakhar Community Conservation Area
 Total evidences/ Locations: 37

Progress:

In study area evidences of Red Panda found in Temperate and Sub alpine zone between 2400 to 3500m. Dominant tree species included *Abies densa*, *Betula utilis*, *Quercus pachyphylla*, *Rhododendron* sp., *Sorbus* sp., *Acer* sp., *Mangolia campabelli*, etc.

Bamboo species found were *Arundinaria maling*, *Arundinaria aristata*, *Thamnocalamus* sp.

- 57 % evidences found in Broad-leaved deciduous forest.
- 32 % evidences found in Broad-leaved coniferous forest.
- Only 11 % evidences found in Oak forest
- Most of the southern facing slopes we observed were dry with less vegetation therefore the occurrence of evidences of Red Panda were more on the northern slopes followed by west and east.

Genetics analysis:

- All field collected samples processed for DNA extraction, genotyping, sequencing and gut microbiota analysis
- 45 Red panda specific SSRs were synthesized, attempted for polymorphism studies,
- Apanel of 9 loci was identified to process individual identification
- Based on SSR analysis, a 21 individual were identified, population genetic parameters were accessed.
- Geneflow identified in the landscape and poulation structure assignment conducted.

Red Panda, *Ailurus fulgens* F. Cuvier, 1825



18

Assessment of amphibian diversity of Central India and identification of cryptic species using integrative taxonomic approach.

Funding Agency:	DST-SERB
Investigator:	Dr. Saipari Sailo
Period:	April 2018 to March 2021
Sanctioned at:	CRZ,ZSI- Jablapur
Status:	Ongoing
Objectives:	Assessment of amphibian diversity of Central India and identification of cryptic species using integrative taxonomic approach

Progress:
One survey conducted and collected 123 specimens of amphibians from Chhattisgarh and Odisha. Identified and registered 7 species of amphibian viz., *Duttaphrynus melanostictus* (Schneider, 1799), *Minervarya syhadrensis* (Annandale, 1919), *Minervarya orisaensis* (Dutta, 1997), *Minervarya kalinga*, *Euphlyctis cyanophlyctis* (Schneider,1799), *Raorchestes sanctisilvaticus* (Das & Chanda, 1997) and *Polypedates maculatus* (Gray, 1834) of Bufonidae (one species), Dicroglossidae (4 species) and Rhacophoridae (2 species).

19

Ant Diversity - as indicator of different habitats in West Bengal

Investigator:	Dr. Sheela, S.
Funding Agency:	West Bengal Biodiversity Board, Govt. of West Bengal.
Period:	December 2017 to December 2019
Sanctioned at:	ZSI-Kolkata
Status:	Ongoing
Objectives:	To explore different habitats for ant communities and diversity in all agro - ecological regions of West Bengal.

- To note the habitat wise association of ant communities and calculate the diversity indices.
- To find out distribution patterns of ant species.

Progress:
Surveys conducted to different regions and 204 species of ants so far identified from West Bengal. Two new species identified. One new record from India, besides, six rare species from West Bengal identified.

Health Assessment of Indian Corals and Coral Reefs

20

Investigator:	Dr. Ch. Satyanarayana,
Funding Agency:	Space Application Centre
Period :	February 2019 - March 2020
Sanctioned at:	SRC, ZSI-Chennai
Status:	Ongoing
Objective:	To investigate the health assessment of Indian Corals and Coral Reefs

Progress:
Biophysical monitoring surveys were carried out at the reefs of Pirotan Island, Poshitra reefs and Mithapur in the Gulf of Kachchh.

Most of the surveyed reefs were covered by Dead Coral with algae (DCA) (37.85%) followed by Macroalgae (MA) (29%).

Coral disease prevalence and bleaching assessment surveys were also carried out at the Kachchh reefs.

A total of 6 coral disease lesions were observed at the studied sites. Corals belonging to Porites spp. are found to be the most prone coral species to disease in the studied reefs.

Total disease prevalence estimated was 0.075% and disease abundance was measured 0.15/m2.

21

Taxonomy, diversity and distribution of Actinaria (Sea Anemones), Polycladida and Sipuncula in Andaman and Nicobar Islands

Investigator:	Dr. C. Raghunathan
Funding Agency:	Ministry of Environment, Forests & Climate Change under AICOPTAX
Period:	October 2016 to September 2019
Sanctioned at:	ANRC, Port Blair
Status:	Ongoing

Objectives:

- Studies on taxonomical exploration of Actinaria (Sea Anemones), Polycladida and Sipuncula in Andaman and Nicobar Islands.
- Studies on diversity and distribution pattern of Actinaria (Sea Anemones), Polycladida and Sipuncula in Andaman and Nicobar Islands.

Progress:

Identified: 14 Sea anemones; 02 Arthropoda; 167 Molluscs. Registered: 20 Sea anemones; 409 Molluscs; 02 Arthropoda. New record to India: 03 species of sea anemone. New record to Andaman & Nicobar Island: 02 species of sea anemone

Objectives:

- Baseline knowledge about the faunal resources and Forest fire hot spot identification for long term monitoring in two districts of one states (Mizoram).
- Development of forest fire management site specific calendar at each forest management unit.
- Development of network of professional & stakeholders in all 2 districts of state to combat forest fire.
- Capacity enhancement of forest departments & others in 2 districts (150 persons).

Progress:

Forest fires are a major environmental problem in North East Region (NER) with large tracts of forest areas being affected in every season. Hence, the better knowledge on forest fire impacts on faunal species and capacity enhancement of the local forest department and other stakeholders will be of great imperatives. During the reporting period reconnaissance surveys were conducted in the Forested habitats of Mamit and Aizwal districts of Mizoram state. The study was conducted after identifying and mapping forest fire zones and characterized into three i.e., No fire, Medium and high fire. In all three zones a one micro-watershed was selected for sampling. In each selected watershed sampling was conducted after marking of 1 ha plot. These plots were represents all topographic variability of the study landscape. The samples were collected systematically w.r.t all taxon. During the period a total of 30 trails/transects covering 168 km were walked, 42 plots were marked in the study area for habitat characterization, 57 camera traps were installed for 1140 trap nights. 48 biological samples (scats, pellets, hair, feather, broken egg shells etc.) were collected, about 1500 examples of different insects were collected. The analysis of the samples is under process. The geo-spatial analysis for identification of forest fire hot spot was carried out and the maps pertaining to fire hot spots were prepared. The analysis of the different type of data is under process. The capacity building workshop will be conducted on 29-30th April 2019.

22

Understanding the impact of forest fire on faunal resources of North Eastern States for conservation and management

Funding Agency:	NMHS, MoEFCC Govt. of India, New Delhi
Investigator:	Dr. Lalit Kumar Sharma
Co-investigator:	Dr. G. Maheswaran
Period:	January 2018 to December 2021
Sanctioned at:	ZSI-Kolkata
Status:	Ongoing

23

Distribution and population assessment of Striped Hyena (*Hyaena hyaena*), Indian Wolf (*Canis lupus pallipes*), Golden Jackal (*Canis aureus*), Leopard Cat (*Prionairulus bengalensis*) and Wild Boar (*Sus scrofa*) in South West Bengal state for conservation and management planning

Funding Agency:	Biodiversity project, Department of Forest, Government of West Bengal
Principal Investigator:	Dr. Kailash Chandra
Co-investigators:	Dr. C. Venkataraman, Dr. Lalit Kumar Sharma & Dr. Mukesh Thakur
Period:	January 2018 to December 2021
Sanctioned at:	ZSI-Kolkata
Status:	Ongoing

Objectives:

- To understand the current distribution and status of all four species viz., Striped Hyena, Indian Wolf, Leopard cat, Golden Jackal and Wild boar in South and Central region of West Bengal.

- Population estimates of the study species using camera traps and DNA based analysis in the intensive study sites.
- To generate quality data on landscape genetic parameters (gene flow, population connectivity, fragmentation) of the selected species in the study landscape.
- Identification of wildlife-human conflict zones in the study area with reference the four species (Striped Hyena, Indian Wolf, Golden Jackal and Wild boar).

Progress:

Surveys have been conducted in four districts of South Bengal region with respect to data collection on distribution of the selected species. For achieving the objective of the project we systematically covered the grids which possess forest cover. After the selection of the study grids we conducted questionnaire surveys and carnivore sign surveys. A total of 1356 questionnaire interviews were conducted in 6 (29 ranges: about 54% of the total ranges 53) forest divisions of 3 districts (Purulia, Bankura and Jhargram). The maximum numbers of interviews were conducted in Purulia district (813) and minimum in Jhargram (108). A total of 97 transects have been surveyed by walking a distance of 322.36 km in all the 28 ranges of six forest divisions. During the reporting period information on species presence, abundance, human-wildlife conflict, non-invasive samples for DNA analysis has been collected. So far distribution, relative abundance of the selected species has been assessed. The human-wildlife conflict zones have been identified in the study landscape. The geo-spatial analysis was carried out for mapping the suitable habitats of the species.

Questionare session with villagers



24

Conservation of Threatened Vertebrate Fauna in Indian Himalayan Region through Long-Term Monitoring and Capacity Building

Funding Agency:	NMHS, MoEFCC Govt. of India, New Delhi
Principal Investigator:	Dr. Kailash Chandra
Nodal Officer:	Dr. Lalit Kumar Sharma
Co-Investigators:	Dr. Vikas Kumar, Dr. Mukesh Thakur & Dr. Kaomud Tyagi
Period:	January 2018 to December 2021
Sanctioned at:	ZSI-Kolkata
Status:	Ongoing

Objectives:

- To assess and monitor threatened vertebrate fauna in the IHR and developing spatial database
- To study the population viability of selected threatened species in IHR for developing long-term conservation strategies
- To set long-term monitoring protocol for threatened vertebrate faunal groups in different parts of IHR and to develop adaptive management strategies for long-term conservation of those species through community engagement
- To enhance capacities of different stakeholders for monitoring and conserving threatened vertebrate fauna capacity building programs and use of modern science, technological tools and approaches.
- Investigating whether ethno-zoological knowledge and practices can be a conservation measure for threatened vertebrate fauna in IHR

Progress:

Combination of different methods/ techniques including sign surveys, camera trapping, non-invasive DNA analysis as well as questionnaire surveys were used to achieve the objectives. The preliminary surveys have been conducted in all six districts/sites in IHR.



Macaca munzala Sinha et. al., 2005

All the six sites (districts) were divided into 10×10 km grids and further 5×5 km grids for intensive sampling. The reconnaissance surveys were conducted to know the presence/ absence and abundance of various vertebrate species. Further intensive areas were identified for long term and intensive monitoring of the faunal groups based on considering weather conditions, terrain, and/or availability of logistics into account. A total of n= 423 trails covering with an effort of 3210.6 km has been made, which resulted in n=2193 samples. Furthermore, A total of n=2865 camera trap night, yielded in n=35 different vertebrate species. About n= 496 samples has been processed for DNA analysis during the period.

Information on ethno-zoology was collected through questionnaire surveys of n=2896 respondents of n=227 villages at all 6 sites. Two state level training workshops and one national level stakeholder workshops have been conducted. The analysis of the different type of data is under process.

25

Assessment of moths
(Lepidoptera) as
significant pollinators in
the Himalayan
Ecosystem of North -
East India

Funding Agency:	MoEF & CC, New Delhi through NMHS programme
Principal Investigator:	Dr. Navneet Singh
Period:	April 2018 to March 2021
Sanctioned at:	ZSI-Kolkata
Status:	Initiated

Objectives

To Prepare a checklist of moth species pollinating different plants and crops in Central & Eastern Himalayan region.

To Prepare a check list of plant species and crops of Central & Eastern Himalayan region which are partially or exclusively pollinated by the moths.

Progress:

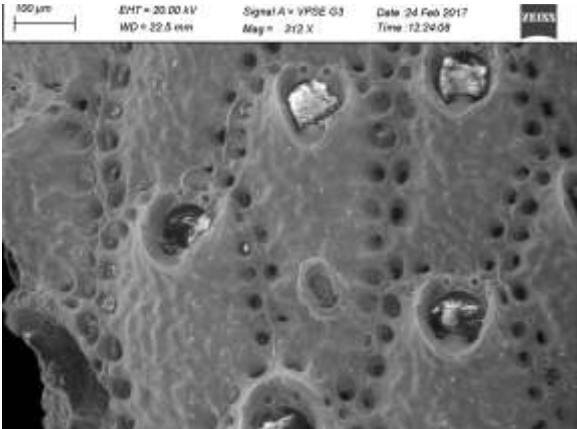
Three surveys were conducted in West Bengal & Arunachal Pradesh. A scientific visit to Birbal Sahani Institute of Paleo sciences, Lucknow was conducted by two JPFs A total of 5756 moth samples belonging to 19 families have been collected. On the other hand 469 plant samples belonging to 45 families have been collected as reference samples. The proboscises of 705 moths have been separated and processed to study the presence of pollens. 468 slides of pollens which were separated from proboscises have been prepared to have a clear cut picture of the pollen for their identification. SEM of 21 proboscises has been done. 258 reference slides of pollens have been prepared which were isolated from the anthers of collected flowers. 67 species of moths have been found to carry 13 different types of pollens.

Aglaomorpha plagiata (Walker, 1855)



26

Studies on the
Bryozoans in Indian
Reefs



Parasmittina alaskensis (Osburn, 1952)

Funding Agency:	MoEF & CC under AICOPTAX
Principal Investigator:	Dr. C. Venkatraman
Period:	August 2018 to July 2021
Sanctioned at:	ZSI-Kolkata
Status:	Initiated

Objectives

Taxonomic study of bryozoans of the Indian reefs.

The influence of environmental condition on distribution and abundance of species

Determine the qualitative and quantitative distribution of bryozoans in Gulf of Mannar Biosphere Reserve.

Progress

Two extensive field survey were undertaken of Gulf of Mannar Biosphere Reserve.

A total of 23 localities were surveyed including various Islands.

Bryozoans colonies were photographed and identified through SEM.

24 species were identified so far. Of which 09 species are new to India and 07 are new to Gulf of Mannar Biosphere Reserve.

27

Diversity of Water-Striders (Hemiptera: Gerridae) from Principal Estuaries of Eastern Coast of India

Funding Agency: MoEF & CC under AICOPTAX

Principal Investigator: Dr. Swetapadma Dash

Period: April 2018 to April 2021

Sanctioned at: EBRC, ZSI - Gopalpur-on-sea

Transferred to: HQ, ZSI - Kolkata

Status: Initiated

Objectives:

- To inventories the species of the water striders (Family: Gerridae) from the Principal Estuaries of Eastern Coast of India.
- To prepare revised key of the water striders (Family: Gerridae) from the Principal Estuaries of Eastern Coast of India.
- To study diversity and distribution of water striders along the East coast of India.

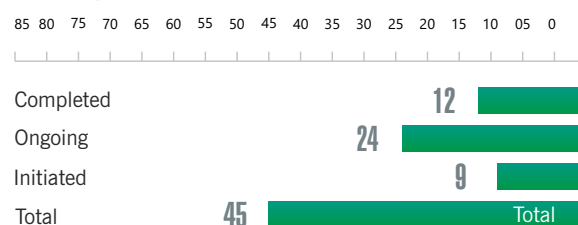
Progress:

Upon inception of the project, literature on the family Gerridae was collected to aid in the identification and standardization of the protocol for sampling and preservation of specimen. Selection of primary sites of collection and study has been made for future surveys after surveying all the principal estuaries of the east coast. A total of seven surveys have been conducted along the eastern coast of India, out of which three were extensive and the rest minor, comprising a total of 39 days resulting in a total collection of 1,461 specimens belonging to the family Gerridae. From the collected specimen, five different species of water striders were identified and each of which were a new record to at least one of the regions they were collected.

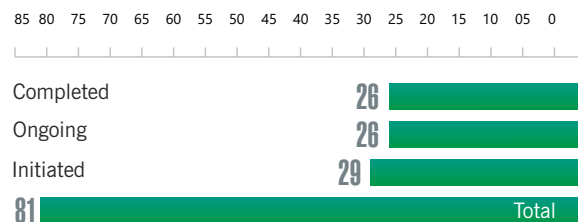
Information on ethno-zoology was collected through questionnaire surveys of n=2896 respondents of n=227 villages at all 6 sites. Two state level training workshops and one national level stakeholder workshops have been conducted. The analysis of the different type of data is under process.

Scientific Programmes 2018-19: A glance

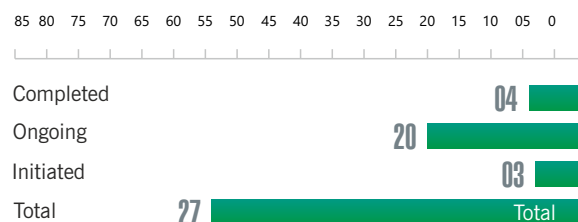
Headquarters ZSI



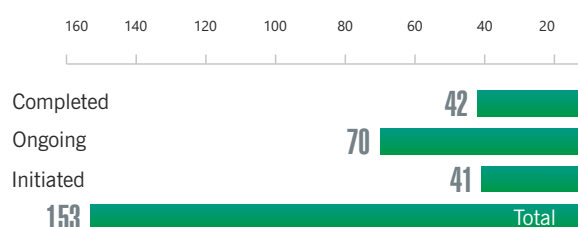
Regional Centres



Externally Funded



Grand Total



LSO

SURVEYS

ANNUAL REPORT 2018-19

Field Survey Division manages the overall surveys carried out by the different scientific divisions of Headquarters as well as Regional Centers. This year 121 surveys were conducted by the scientists of Headquarters and Regional Centres.

Details of Surveys conducted during the year 2018-19

Details of Surveys	Headquarters		Regional Centres
1. State & Union Territories Level Survey	05		10
2. Ecosystems			
2a. Marine/Island ecosystem	02		10
2b. Fresh Water ecosystem	04		03
2b. Tropical Rain Forest	02		01
2c. Estuarine ecosystem	02		01
2d. Mangrove ecosystem	03		-
2e. Alpine Grassland of Himalayas	-		03
2f. Himalayan Ecosystem	-		02
2g. Desert ecosystem	-		02
3. Protected / Conservation Areas	14		31
4. Status Survey of Endangered Species	04		03
5. Ecological & Behavioral Studies	02		-
6. Taxonomic Studies	05		12
TOTAL	43		78
Grand Total			121

Altogether 62475 specimens belonging to 1876 species have been identified by the scientists of ZSI Headquarters and Regional Centres ranging from microscopic to the highly evolved organisms

Objective	Action	Success Indicators	Unit	Target Value for Financial Year 2018-2019	Achievement up to 31/03/2019	Percentage (%)
Survey, documentation & conservation of Wild faunal diversity of the country & identification of	Survey of Forest Ecosystems, Protected Areas & Fragile Ecosystems	Surveys conducted	No.	100	121	120.0
New taxa	Digitization of national Zoological collections	Faunal Specimens digitized	No.	10,000	38176	381.76
Taxonomic studies on faunal diversity	Identification of specimens collected from different Survey tours	Number of Specimens identified	No.	25,000	62475	249.9
Maintenance of National Zoological Collections	Registration of National Zoological Collection	Number of specimens registered	No.	25,000	62475	249.9
Advanced studies on Faunal Diversity	Application of modern tools on Faunal Diversity	Number of specimens studied through modern tools	No.	100	219	219.0



20

**NEW
DISCOVERIES**

ANNUAL REPORT 2018-19

Biodiversity is essentially the number of species found in a particular area. Discovering new species increases the faunal resource of our country. ZSI had played major role in discovering new species and 4913 new species have been described by the scientists of ZSI since its inception. This year another 104 new species were described and 55 species were added as new record to India.

NEW DISCOVERIES

104

new species were described by the scientists of ZSI belonging to twenty faunal group

Details of the new discoveries by the scientists of ZSI and other institutes/Colleges are published yearly in the Book "Animal Discoveries" and is available on ZSI website (zsi.gov.in).

NEW DISCOVERIES BY ZSI SCIENTISTS DURING 2018

02 New species of Platyhelminthes

1. *Pseudoceros meenae* Dixit, Sivaperuman and Raghunathan.
2. *Acanthozoon fuscobulbosum* Dixit, Sivaperuman and Raghunathan

04 New species of Nematoda

1. *Rhabdias stomatica* Maity, Rizvi and Bursey
2. *Cobbia bengalensis* Datta, Bhowmik and Choudhury
3. *Amphibelondira wasimi* Roy, Gantait and Chatterjee
4. *Rhabdias garhwalensis* Maity, Rizvi, Bursey and Basu

01 New species of Acanthocephala

1. *Neoechinorhynchus dighaensis* Gautam, Mohapatra, Saxena

03 New species of Annelida

1. *Haemadipsa kaushiki* Mandal, Paul, Hasan and Bandyopadhyay
2. *Placobdella bundiensis* Mandal, Paul, Hasan and Bandyopadhyay
3. *Placobdella devkuntai* Mandal, Paul, Hasan and Bandyopadhyay

09

**New species of
Arachnida**

1. *Pellenes (Pelmultus)*
Iva Caleb and Kumar
2. *Colyttus proszynskii*
Caleb, Chatterjee, Tyagi, Kundu and Kumar
3. *Synagelides brahmaputra*
Caleb, Chatterjee, Tyagi, Kundu and Kumar
4. *Nandicius vallisflorum*
Caleb, Sajan and Kumar
5. *Pellenes (Pelmultus)*
Himalaya Caleb, Sajan and Kumar
6. *Brettus gravelyi*
Caleb, Acharya and Kumar
7. *Pseudopoda cheppe*
Caleb, Mondal and Kumar
8. *Rhysida laetus* Dhanya and Sureshan
9. *Rhysida shenduruniensis* Dhanya and Sureshan

13

**New species of
Crustacea**

1. *Ghatiana botti*
Pati and Thackeray
2. *Ghatiana pulchra*
Pati and Thackeray
3. *Ghatiana rathbunae*
Pati and Thackeray
4. *Gubernatoriana longipes*
Pati and Thackeray
5. *Gubernatoriana marleshwariensis*
Pati and Thackeray
6. *Gubernatoriana wallacei*
Pati and Thackeray
7. *Sahyadriana billyarjani*
Pati and Thackeray
8. *Sahyadriana pachyphallus*
Pati and Thackeray
9. *Sahyadriana sahyadriensis*
Pati and Thackeray
10. *Sahyadriana tenuiphallus*
Pati and Thackeray
11. *Sahyadriana woodmasoni*
Pati and Thackeray
12. *Joryma malabaricus*
Aneesh, Helna, Trilles and Chandra
13. *Teretamon kempi*
Mitra, Payra and Chandra

04

**New species of
Collembola**

1. *Falcomurus chilikaensis* Mandal
2. *Calx kailashi* Mandal
3. *Folsomia arunachalensis* Mandal
4. *Bourletiella meghalayensis* Mandal

03

**New species of
Coleoptera**

1. *Brachypeplus rugisternus*
Dasgupta and Pal
2. *Brachypeplus pallidus*
Dasgupta and Pal
3. *Bolboceras sahyadriensis*
Kalawate and Hillert

03

**New species of
Diptera**

1. *Heligmonevra paruii* Naskar,
Maity and Banerjee
2. *Parallelodiplosis andamanensis*
Vasanthakumar and Sharma
3. *Lobus lineatus* Naskar,
Maity, Homechaudhuri, Parui and Banerjee

06

**New species of
Hemiptera**

1. *Ptilomera (P.) nagalanda*
Jehamalar, Chandra, Basu and Selvakumar
2. *Metrocoris sikkimensis*
Basu, Chandra and Venkatesan
3. *Helotrephes nainamalaii*
Jehamalar, Chandra and Zettel
4. *Aleuroparvus theae* Dubey
5. *Aleurolobus nandiensis*
Vimala and Ramachandran
6. *Aleurolobus scutiae*
Vimala and Ramachandran

19

New species of Hymenoptera

1. *Klabonosa indica* Gupta, Sureshan and Yeshwanth
2. *Pycnetron keralaensis* Farsana, Sureshan and Nikhil
3. *Centistidea crenulator* Ranjith, van Achterberg, Priyadarsanan, Kim, Keloth, Mukundan and Nasser
4. *Centistidea glabrator* Ranjith, van Achterberg, Priyadarsanan, Kim, Keloth, Mukundan and Nasser
5. *Centistidea lineator* Ranjith, van Achterberg, Priyadarsanan, Kim, Keloth, Mukundan and Nasser
6. *Centistidea mellapicalis* Ranjith, van Achterberg, Priyadarsanan, Kim, Keloth, Mukundan and Nasser
7. *Centistidea procarinator* Ranjith, van Achterberg, Priyadarsanan, Kim, Keloth, Mukundan and Nasser
8. *Centistidea rugator* Ranjith, van Achterberg, Priyadarsanan, Kim, Keloth, Mukundan and Nasser
9. *Centistidea scutellator* Ranjith, van Achterberg, Priyadarsanan, Kim, Keloth, Mukundan and Nasser
10. *Sphegigaster punensis* Sureshan, Fand and Nikhil
11. *Dolichurus venkataramani* Kumar and Sheikh
12. *Megachalcis kannapuramensis* Sureshan, Kumar and Chares
13. *Carinibracon orientalis* Ranjith, Manjusa, Kumar and Nasser
14. *Spilomena keralaensis* Rajan, Sureshan and Kumar
15. *Sphecodes almoransis* Gupta and Saini
16. *Dipara elevata* Sureshan
17. *Dipara nitidofrena* Sureshan
18. *Netomocera calicutensis* Sureshan, Raseena and Nikhil
19. *Stenodyneriellus and amanicus* Kumar, Carpenter and Srinivasan

04

New species of Lepidoptera

1. *Katha volynkini* Joshi & Singh
2. *Orybina pseudoflaviplaga* Singh and Ranjan
3. *Barsine pseudoradians* Joshi, Singh & Volynkin
4. *Neoaloea cernyi* Singh and Joshi

01

New species of Odonata

1. *Nososticta nancowra* Rajeshkumar and Raghunathan

10

New species of Orthoptera

1. *Brachyxenica subtruncata* Gupta, Chandra and Dang
2. *Tridactylus bijakherensis* Gupta, Shi and Chandra
3. *Anaptygus himalayicus* Kumar and Chandra
4. *Acrida raipurensis* Gupta and Chandra
5. *Acrida bhoramdevi* Gupta and Chandra
6. *Criotettix gidhavensis* Gupta and Chandra
7. *Criotettix gariyabandicus* Gupta and Chandra
8. *Thoradonta subtruncata* Gupta, Shi, Chandra
9. *Mesambria indica* Kumar and Chandra
10. *Oxytauchira truncata* Kumar and Chandra

01

New species of Phasmida

1. *Pseudososibia albidotarsi*
Srinivasan, Mukherjee and Chatterjee

08

New species of Trichoptera

1. *Kisaura dirangensis* Pandher,
Kaur and Parey
2. *Kisaura vikrami* Pandher,
Kaur and Parey
3. *Kisaura sainii* Pandher,
Kaur and Parey
4. *Cheumatopsyche meghalayaensis*
Pandher, Malicky and Parey
5. *Plectrocnemia fischeri* Pandher
6. *Polyplectropus himachalica*
Pandher and Parey
7. *Polyplectropus sainii* Pandher and Parey
8. *Polyplectropus kailashchandrai* Pandher and
Parey

01

New species of Thysanoptera

1. *Haplothrips shivendrai*
Tyagi, Singha, Saha and Kumar

05

New species of Pisces

1. *Gymnothorax odishi*
Mohapatra, Mohanty, Smith, Mishra and Roy
2. *Ophichthus johnmccoskeri*
Mohapatra, Ray, Mohanty and Mishra
3. *Channa stiktos*
Lalramliana, Knight, Lalhlimpuia and Singh
4. *Nemipterus andamanensis*
Bineesh, Russell and Chandra
5. *Olyra parviocula*
Kosygin, Shangningam and Gopi

02

New species of Amphibia

1. *Fejervarya krishnan* Raj, Dinesh, Das, Dutta,
Kar and Mohapatra
2. *Fejervarya kalinga* Raj, Dinesh, Das, Dutta, Kar
and Mohapatra

05

New species of Reptilia

1. *Trachischium sushantai* Raha, Das, Bag,
Debnath and Pramanick
2. *Sitana attenboroughii* Sadasivan, Ramesh,
Palot, Ambekar and Mirza
3. *Sitana thondalu* Sadasivan, Ramesh, Palot,
Ambekar and Mirza
4. *Cnemaspis anamudiensis* Cyriac, Johny, Umesh
and Palot
5. *Cnemaspis maculicollis* Cyriac, Johny, Umesh
and Palot

Pseudoceros meenae Dixit et.al., 2018

55 NEW RECORDS TO INDIA



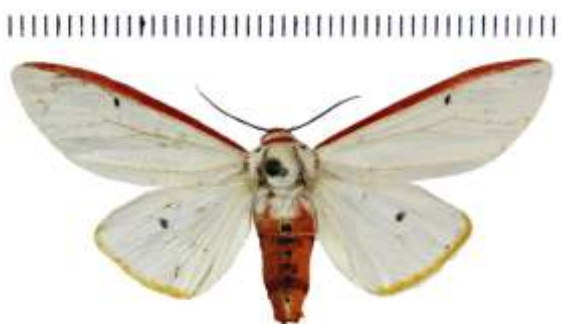
Lobus lineatus Naskar et al., 2018(Pallas, 1766)

1. *Myotis altarium*
Thomas, 1911
2. *Megophrys pachyproctus*
Huang, 1981
3. *Scorpaenopsis diabolus*
(Cuvier, 1829)
4. *Cryptocentrus filifer*
(Valenciennes, 1837)
5. *Lutjanus xanthopinnis*
Iwatsuki, Tanaka et Allen, 2015
6. *Cephalopholis nigripinnis*
(Valenciennes, 1828)
7. *Epinephelus retouti*
Bleeker, 1868
8. *Diploconger polystigmatus*
Kotthaus, 1968
9. *Gymnothorax zonipectis*
Seale, 1906
10. *Allips concolor*
McCosker, 1972
11. *Trypostega henrychaneyi*
Tilbrook, 2006
12. *Catenicella uberrima*
(Harmer, 1957)
13. *Microporella pectinata*
Tilbrook, 2006
14. *Smittipora abyssicola*
(Smitt, 1873)
15. *Smittipora cordiformis*
Harmer, 1926

16. *Triphyllozoon philippinense*
(Busk, 1884)
17. *Robertsonidra praecipua*
Hayward & Ryland, 1995
18. *Watersipora souleorum*
Vieira, Spencer Jones and Taylor, 2014
19. *Polycarpa argentata*
(Sluiter, 1890)
20. *Polycarpa papyra*
Kott, 1985
21. *Symplegma rubra*
Monniot, 1972
22. *Drupella cornus*
Röding, 1798
23. *Symmorphus* (*Symmorphus*)
Ambotretus Cumming, 1989
24. *Bastilla angularis*
(Boisduval, 1833)



Bolboceras sahyadriensis Kalawate & Hillert, 2018



Neolaoa cernyi Singh & Joshi, 2018

25. *Dolgoma rectoides*
Dubatolov, 2012
26. *Microlithosia pseudodecreta*
Bucsek, 2012
27. *Orientalicesa confasciatus*
Tan and Carpenter, 2018
28. *Symmorphus* (*Symmorphus*) *alkinus alkinus*
Cumming and van der Vecht, 1986
29. *Dolichurus albifacies*
Krombein, 1979
30. *Dolichurus amamiensis*
Tsuneki and Iida, 1964
31. *Enithares unicata*
Lundblad, 1933
32. *Bemisias pongamiae*
Takahashi, 1931
33. *Phaenacantha* (*Phaenacantha*) *sedula*
Horváth, 1904
34. *Cylindrostethus costalis costalis*
Schmidt, 1915
35. *Bolboceras insulare*
Krikken, 2013
36. *Blaps orientalis* Solier, 1848
37. *Mesomorphus latiusculus*
(Chatanay, 1917)
38. *Cenopalpus picipilis*
(Chaudhri, 1971)
39. *Tenuipalpus crassulus*
Baker and Turtle, 1972
40. *Tenuipalpus leipoldti*
Meyer, 1993
41. *Anilocra leptosoma*
Bleeker, 1857
42. *Hyptiotes affinis*
Bosenberg and Strand, 1906
43. *Cunaxa evansi* Smiley, 1992
44. *Dactyloscirus fuscus*
Chaudhri, 1977
45. *Amblyseius impressus*
Denmark and Muma, 1973
46. *Brevipalpus melichrus*
Pritchard & Baker, 1952
47. *Brevipalpus mitrofanovi*
(Pegazzano, 1975)
48. *Brevipalpus turrialbensis*
Manson, 1963
49. *Micaria dives*
(Lucas, 1846)
50. *Menemerus nigli*
Wesolowska & Freudenschuss, 2012
51. *Actinoporus elegans*
Duchassaing, 1850
52. *Stichodactyla tapetum*
(Hemprich & Ehrenberg in Ehrenberg, 1834)
53. *Heterodactyla hemprichii*
Ehrenberg, 1834
54. *Thalassianthus aster*
Rüppell & Leuckart, 1828
55. *Distichopora violacea*

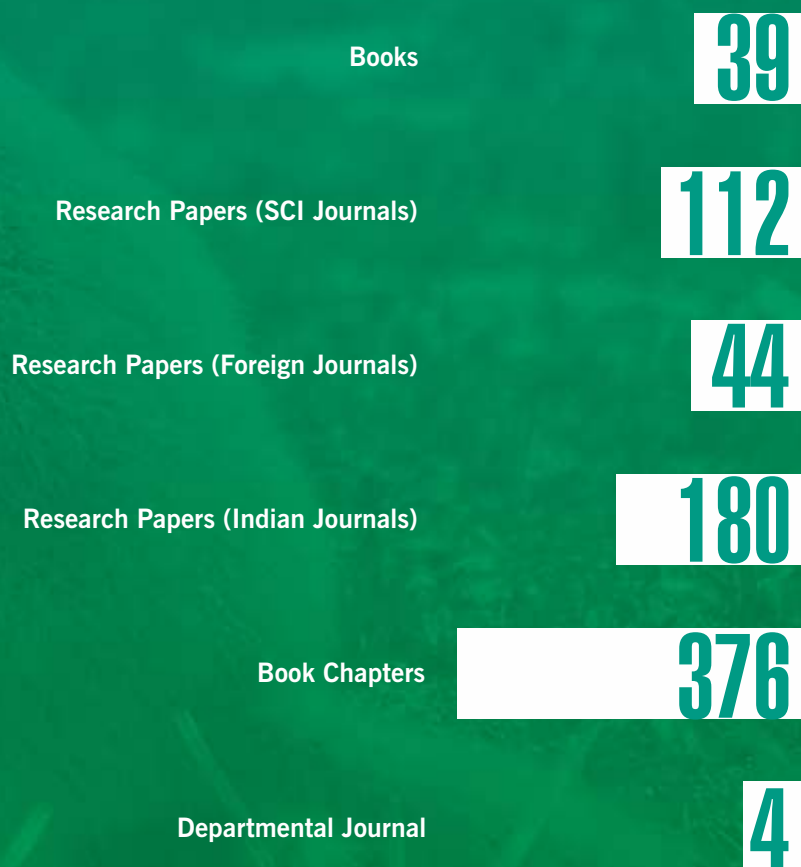
Gymnothorax odishi Mohapatra et.al., 2018





70

PUBLICATIONS



TOTAL PUBLICATIONS BY ZSI (IN HOUSE) (39)

JOURNAL (4 ISSUES)

Records of the Zoological Survey of India

(online: <http://recordsofzsi.com/> and print)

1. Volume 118 Issue 1 (9 articles, 5 short communications)
2. Volume 118 Issue 2 (6 articles, 3 short communications)
3. Volume 118 Issue 3 (10 articles, 4 short communications)
4. Volume 118 Issue 4 (10 articles, 3 short communications)

BOOKS (39)

Occasional Papers

1. Sharma, G. and Girish Kumar, P. 2018. Studies on selected families of Hymenoptera (Apidae, Halictidae, Megachilidae, Scolidae and Vespidae) from Sunderbans. *Rec. zool. Surv. India, Occ. Paper No.* 388: 1-70.
2. Balan, D. and Sureshan, P. 2018. Taxonomic Studies on the Scolopendrid Centipedes (Chilopoda: Scolopendromorpha) of Kerala State, India. *Rec. zool. Surv. India, Occ. Paper No.* 389: 1-91.
3. Raghunathan, C., Tamal Mondal, R. Raghuraman, S. Kumarlingam and J.S. Yogesh Kumar. 2018. Status of corals & reef associated faunal communities in Rani Jhansi Marine National Park, Andaman and Nicobar Islands. *Rec. zool. Surv. India, Occ. Paper No.* 390: 1-164.
4. Raghunathan, C. 2018. Status of coral and its associated fauna of Landfall Island, Table Delgarno and Trilby Islands Sanctuaries, North Andaman. *Rec. zool. Surv. India, Occ. Paper No.* 391: 1-140.
5. Chandra, K., Raghunathan, C. and Mandal, T. 2018. Faunal Diversity of Seagrass Ecosystems in India. *Rec. zool. Surv. India, Occ. Paper No.* 392: 1-148.
6. Pandey, K.C. and Agarwal, N. 2018. Trematode fauna of Freshwater fishes of India. *Rec. zool. Surv. India, Occ. Paper No.* 393: 1-388.
7. Sharma, G. 2018. Studies on Odonata and

Lepidoptera fauna of Desert Ecosystem of Rajasthan. *Rec. zool. Surv. India, Occ. Paper No.* 394: 1-76.

8. Sinha, B. 2018. Fish diversity of West Siang district, Arunachal Pradesh. *Rec. zool. Surv. India, Occ. Paper No.* 395: 1-80.
9. Subramanian, K. A., Emiliyamma, K. G., Babu, R., Radhakrishnan, C. and Talmale, S. S. 2018. Atlas of Odonata (Insecta) of the Western Ghats: 1-147.
10. Sanyal, A.K. 2019. Catalogue of Oribatid Mites of India. *Rec. zool. Surv. India, Occ. Paper No.* 396: 1-147.

Conservation Area Series

1. Fauna of Malabar Wildlife Sanctuary, Kozhikode, Kerala, Conservation Area Series, 2019, 62: 1-326.
2. Faunal Diversity of Chail Wildlife Sanctuary, Conservation Area Series, 2018, 63: 1-151
3. Faunal Diversity of Kachchh Biosphere Reserve, Conservation Area Series, 2018, 64: 1-227.

Ecosystem Series

1. Himalayan Ecosystem Series, 4, Fauna of Cold Desert Spiti Valley and Chandratla Lake: 1-111.

Status Survey

1. Tripathy, B., Mohapatra, A. and Mukhopadhyay, A.K. 2018. Status Survey of Western Hoolock Gibbon, Status Survey Report, 13: 1-110.

Fauna of India

1. Sanyal, A.K. 2018. Fauna of India - Acari: Cryptostigmata Oribatei Inferiores (Paleosomata, Parhyposomata, Enarthronota, Mixonomata) (Part-1): 1-308.

Special Publications

1. Chandra, K. and Sheela, S. 2018. *Animal Discoveries 2017: New Species and New Records*: 1-116 (Published by the Director, Zool. Surv. India, Kolkata).
2. Chandra, K., Tripathy, B., Sharma, L.K., Mondal, K., Kumar, H., Saini, J., Sajan, S.K., Chatterjee, P., Payra, A., Ghosh, D., Deepak, C.K. and Sen, S. 2018. *Toolkit for Long-term Monitoring of the Faunal Resources in the Indian Himalaya*. Zoological Survey of India, Kolkata, 1-84.
3. Chandra, K., Gupta, D., Gopi, K.C., Tripathy,

- B. and Kumar, V. 2018. *Faunal Diversity of Indian Himalaya*: 1-872 (Published by the Director, Zool. Surv. India, Kolkata).
4. Chandra, K., Raghunathan, C. and Dash, S. 2018. *Current Status of Estuarine Diversity of India* (Published by the Director, Zoo. Surv. India, Kolkata). 1-576.
 5. Kundu, S., Kumar, V., Murthy, B.H.C.K. and Chandra, K. 2018. *Chelonian Types of National Zoological Collections*: 1-70 (Published by the Director, Zool. Surv. India, Kolkata).
 6. Chandra, K. and Raghunathan, C. 2018. *Faunal Diversity of Biogeographic Zones: Islands of India*: 1-523. (Published by the Director, Zool. Surv. India, Kolkata).
 7. Chandra, K., Gopi, K. C., Rizvi, A. N. and Hassan, M. E. 2018. Annual Report 2016-17: 1-252.
 8. Singh, R.P., Manoharan, M., Hemambika, B., Sivaperuman, C., Sankar, K. and Chandra, K. 2019. *Bibliography on Wildlife Studies in Andaman and Nicobar Islands*. Slim Ali Centre for Ornithology and Natural History, Coimbatore, Tamil Nadu and Zoological Survey of India, Kolkata pp. 373.
 9. Sheela, S., Das, D., Shah, S.K. and Chandra, K. 2018. *The Type Specimens in the National Zoological Collection: Lepidoptera, Type Catalogue Series*, 4: 1-342 (Published by the Director, Zool. Surv. India, Kolkata).
 10. Chandra, K., Rizvi, A.N., Acharya, S. and Raghunathan, C. 2019. *Manual on Collection, Preservation and Identification of Soil Fauna*: 1-222 (Published by Zool. Surv. India, Kolkata).
 11. Chandra, K. and Boaz, A.A. 2018. *Faunal Diversity of Bastar District, Chhattisgarh*: 1-706 (Published by the State Forest Research and Training Institute, Forest Department, Chhattisgarh & Zoological Survey of India).
 12. Chandra, K. and Boaz, A.A. 2018. *Fauna of Achanakmar Tiger Reserve, Chhattisgarh*: 1-486 (Published by the State Forest Research and Training Institute, Forest Department, Chhattisgarh & Zoological Survey of India).
 13. Chandra, K. and Boaz, A.A. 2018. *Faunal Diversity of Surguja District, Chhattisgarh*: 1-477 (Published by the State Forest Research and Training Institute, Forest Department, Chhattisgarh & Zoological Survey of India).
 14. Chandra, K. and Boaz, A.A. 2018. *Faunal Diversity of Durg District, Chhattisgarh*: 1-414 (Published by the State Forest Research and Training Institute, Forest Department, Chhattisgarh & Zoological Survey of India).
 15. Chandra, K. and Boaz, A.A. 2018. *Fauna of Undanti Sitandi Tiger Reserve, Chhattisgarh*: 1-414 (Published by State Forest Research & Training Institute, Forest Department, Chhattisgarh, and Zoological Survey of India, Kolkata).
 16. Chandra, K. and Boaz, A.A. 2018. *Fauna of Boramdev Wildlife Sanctuary, Chhattisgarh*: 1-470 (Published by State Forest Research & Training Institute, Forest Department, Chhattisgarh, and Zoological Survey of India, Kolkata).
 17. Chandra, K. and Boaz, A.A. 2018. *Fauna of Gomarda Wildlife Sanctuary, Chhattisgarh*: 1-342 (Published by State Forest Research & Training Institute, Forest Department, Chhattisgarh, and Zoological Survey of India, Kolkata).
 18. Chandra, K. and Boaz, A.A. 2018. *Faunal Diversity of Kabirdham District, Chhattisgarh*: 1-494 (Published by State Forest Research & Training Institute, Forest Department, Chhattisgarh, and Zoological Survey of India, Kolkata).
 19. Chandra, K. and Boaz, A.A. 2018. *Fauna of Badalkhol Wildlife Sanctuary, Chhattisgarh*: 1-398 (Published by State Forest Research & Training Institute, Forest Department, Chhattisgarh, and Zoological Survey of India, Kolkata).
 20. Chandra, K. and Boaz, A.A. 2018. *Fauna of Barnawapara Wildlife Sanctuary, Chhattisgarh*: 1-598 (Published by State Forest Research & Training Institute, Forest Department, Chhattisgarh, and Zoological Survey of India, Kolkata).
 21. Chandra, K. and Boaz, A.A. 2018. *Faunal Diversity of Karba District, Chhattisgarh*: 1-413 (Published by the State Forest Research and Training Institute, Forest Department, Chhattisgarh & Zoological Survey of India).
 22. Chandra, K. and Boaz, A.A. 2018. *Fauna of Guru Ghasidas National Park, Chhattisgarh*: 1-534. Published by the State Forest Research and Training Institute, Forest Department, Chhattisgarh & Zoological Survey of India.
 23. Chandra, K. and Boaz, A.A. 2018. *Faunal Diversity of Bilaspur District, Chhattisgarh*: 1-542. Published by the State Forest Research and Training Institute, Forest Department,

RESEARCH PAPERS IN SCI JOURNALS (112)

1. Aneesh, P. T., Helna, A. K., Trilles, J. P. and Chandra, K. 2018. A taxonomic review of the genus *Joryma* Bowman and Tareen, 1983 (Crustacea: Isopoda: Cymothoidae) parasitizing the marine fishes from Indian waters, with a description of a new species. *Marine Biodiversity*, 49(3): 1449-1478.
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PUBLICATIONS
DURING THE
LAST FOUR YEARS

	2015-16	2016-17	2017-18	2018-19
Books	33	33	30	39
National & International Journals	314	348	305	604
SCI Journals	37	50	84	112
Total Publications	384	431	419	755

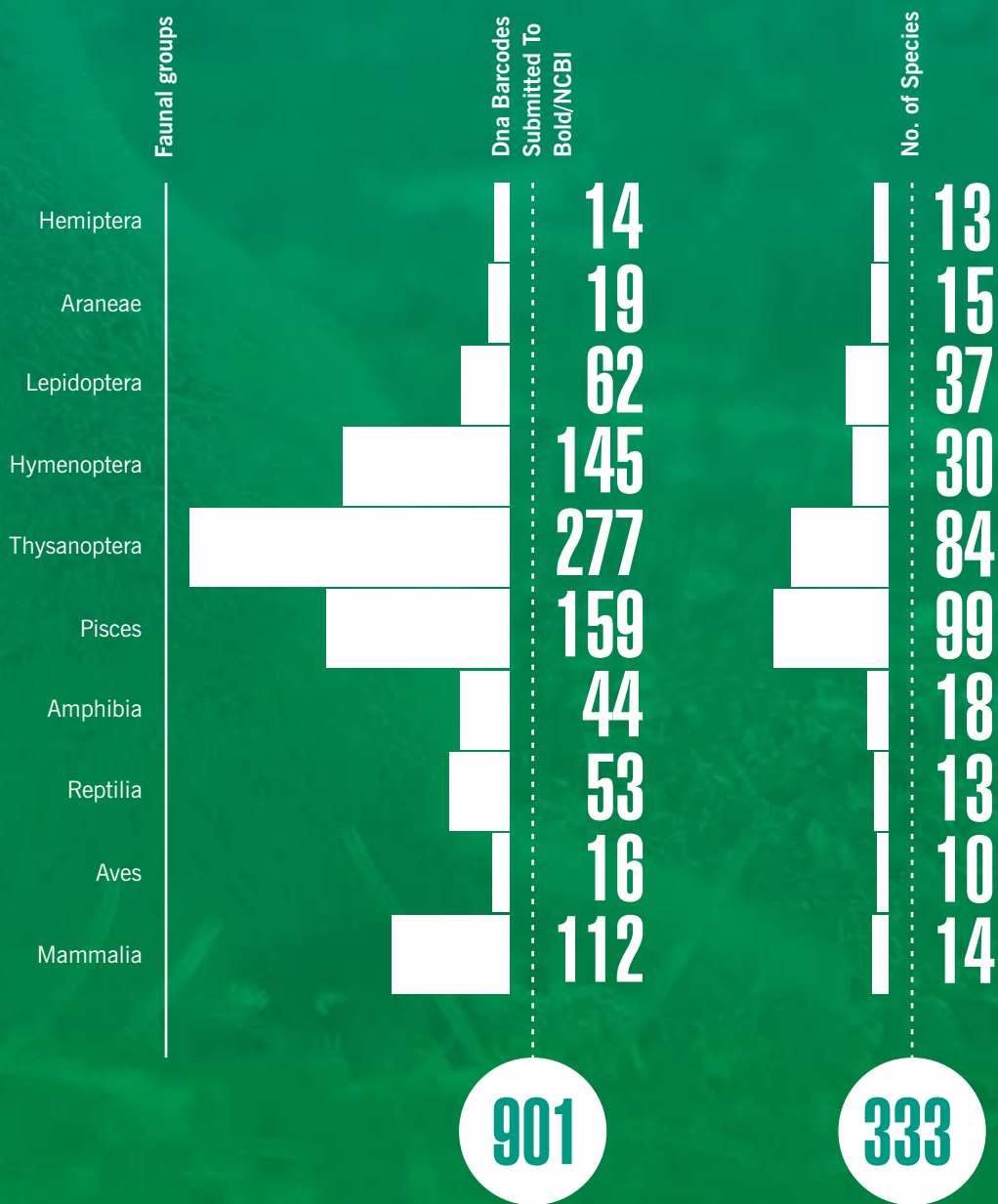
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DNA BARCODES SUBMITTED TO BOLD/NCBI

(DIGITAL SEQUENCE INFORMATION)

ANNUAL
REPORT

2018-19



Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
1.	Barcoding of Heteroptera from India	Hem_81	<i>Cylindrostethus productus</i>	BOLD:ADO7852
2.		Hem_69	<i>Laccotrephes ruber</i>	BOLD:ABV2898
3.		Hem_85	<i>Ptilomera laticaudata</i>	BOLD:AAV0103
4.		Hem_1	<i>Ptilomera laticaudata</i>	BOLD:ADM5396
5.		Hem_2	<i>Hydrometra greeni</i>	BOLD:ADB8815
6.		Hem_3	<i>Neogerris parvulus</i>	BOLD:ADL8996
7.		Hem_19	<i>Diplonychus rusticus</i>	BOLD:ADM4443
8.		Hem_21	<i>Physopelta gutta</i>	BOLD:AAZ2339
9.		Hem_25	<i>Pentatomidae</i>	BOLD:ADM6825
10.		Hem_27	<i>Macrocheraia grandis</i>	BOLD:AAZ2263
11.		Hem_35	<i>Ptilomera himalayensis</i>	BOLD:ADF7668
12.		Hem_42	<i>Lethocerus indicus</i>	BOLD:ADM4277
13.		Hem_48	<i>Diplonychus molestus</i>	BOLD:AAZ8466
14.		Hem_53	<i>Ptilomera assamensis</i>	BOLD:ADM5396
15.	DNA barcoding of Fish of Chilika Lake Odisha India	F_1	<i>Eleutheronema tetradactylum</i>	BOLD:AAB8458
16.		F_2	<i>Mugil cephalus</i>	BOLD:AAW7354
17.		F_3	<i>Thryssa polybranchialis</i>	BOLD:ADJ9879
18.		F_4	<i>Nematalosa nasus</i>	BOLD:ABY2938
19.		F_5	<i>Triacanthus nieuhofii</i>	BOLD:ADI2430
20.		F_6	<i>Hyporhamphus limbatus</i>	BOLD:ACS5708
21.		F_7	<i>Ichthyocampus carce</i>	BOLD:ADB2646
22.		F_8	<i>Ichthyocampus carce</i>	BOLD:ADB2646
23.		F_9	<i>Thryssa polybranchialis</i>	BOLD:ABY2938
24.		F_10	<i>Escualosa thoracata</i>	BOLD:AAB7979
25.		F_11	<i>Triacanthus nieuhofii</i>	BOLD:ADI2430
26.		F_12	<i>Atherinomorus lacunosus</i>	BOLD:ADJ5771
27.		F_13	<i>Escualosa thoracata</i>	BOLD:ACS1475
28.		F_14	<i>Escualosa thoracata</i>	BOLD:ADJ9879
29.		F_15	<i>Eleutheronema tetradactylum</i>	BOLD:AAB8458
30.		F_16	<i>Mugil cephalus</i>	BOLD:AAG3686
31.		F_17	<i>Strongylura strongylura</i>	BOLD:AAD4770
32.		F_19	<i>Osteogeneiosus militaris</i>	BOLD:AAE3816
33.		F_20	<i>Gerres phaiya</i>	BOLD:ADE0109
34.		F_21	<i>Gerres phaiya</i>	BOLD:ADE0109
35.		F_22	<i>Oreochromis mossambicus</i>	BOLD:AAA8511
36.		F_23	<i>Terapon puta</i>	BOLD:AAI0759
37.		F_24	<i>Daysciaena albida</i>	BOLD:ACV8537
38.		F_25	<i>Cynoglossus puncticeps</i>	BOLD:AAE3000
39.		F_26	<i>Ambassis ambassis</i>	BOLD:ACJ3337
40.		F_29	<i>Pethia ticto</i>	BOLD:AAU1560
41.		F_30	<i>Atherinomorus duodecimalis</i>	BOLD:ADJ5771

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
42.		F_32	<i>Carangoides praeustus</i>	BOLD:AAH6462
43.		F_34	<i>Nematalosa nasus</i>	BOLD:ABY2938
44.		F_36	<i>Puntius sophore</i>	BOLD:ACW5482
45.		F_37	<i>Rhabdosargus sarba</i>	BOLD:AAC4119
46.		F_39	<i>Arius arius</i>	BOLD:AAD9382
47.		F_40	<i>Cynoglossus puncticeps</i>	BOLD:AAE3000
48.		F_43	<i>Taenioides cirratus</i>	BOLD:ADK4674
49.		F_44	<i>Daysciaena albida</i>	BOLD:ACV8537
50.		F_45	<i>Daysciaena albida</i>	BOLD:ACV8537
51.		F_46	<i>Datnioides polota</i>	BOLD:ACV9434
52.		F_47	<i>Puntius sophore</i>	BOLD:ACW5482
53.		F_51	<i>Leiodon cutcutia</i>	BOLD:ACA8710
54.		F_52	<i>Epinephelus coioides</i>	BOLD:AAB8391
55.		F_53	<i>Crenimugil buehneri</i>	BOLD:AAE6698
56.		F_54	<i>Mystus gulio</i>	BOLD:ACH1421
57.		F_55	<i>Pomadasys kaakan</i>	BOLD:AAD6593
58.		F_56	<i>Lutjanus indicus</i>	BOLD:AAB2905
59.		F_58	<i>Gonialosa manmina</i>	BOLD:ABY2938
60.		F_59	<i>Scatophagus argus</i>	BOLD:AAB3531
61.		F_60	<i>Pisodonophis boro</i>	BOLD:ADK4187
62.		F_63	<i>Platycephalus indicus</i>	BOLD:AAF1425
63.		F_67	<i>Lates calcarifer</i>	BOLD:AAA8762
64.		F_68	<i>Heteropneustes fossilis</i>	BOLD:ADL4540
65.		F_69	<i>Mastacembelus armatus</i>	BOLD:ADL8513
66.		F_70	<i>Channa punctata</i>	BOLD:AAE8814
67.		F_71	<i>Notopterus notopterus</i>	BOLD:AAF2803
68.		F_72	<i>Eleotris melanosoma</i>	BOLD:ACV9049
69.		F_74	<i>Anabas cobojius</i>	BOLD:ABA9363
70.		F_76	<i>Trypauchen vagina</i>	BOLD:AAM5072
71.		F_77	<i>Rhinomugil corsula</i>	BOLD:ABV4537
72.		F_78	<i>Etroplus suratensis</i>	BOLD:AAF3969
73.		F_81	<i>Siganus canaliculatus</i>	BOLD:ACR6962
74.		F_86	<i>Brachirus orientalis</i>	BOLD:ACZ6303
75.		F_89	<i>Ophisternon bengalense</i>	BOLD:ADK0463
76.		F_90	<i>Gerres limbatus</i>	BOLD:ABW1366
77.		F_104	<i>Arius gagera</i>	BOLD:AAD9382
78.		F_105	<i>Thryssa stenosoma</i>	BOLD:AAE7811
79.		F_106	<i>Lutjanus fulviflamma</i>	BOLD:ADF5681
80.		F_107	<i>Triacanthus nieuhofii</i>	BOLD:ADI2430
81.		F_109	<i>Triacanthus nieuhofii</i>	BOLD:ADI2430
82.		F_110	<i>Triacanthus nieuhofii</i>	BOLD:ADI2430

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
83.		F_117	<i>Thryssa gautamiensis</i>	BOLD:AAE7811
84.		F_119	<i>Escualosa thoracata</i>	BOLD:ACS1475
85.		F_120	<i>Glossogobius guiris</i>	BOLD:AAC6086
86.		F_123	<i>Stolephorus baganensis</i>	BOLD:ADG4839
87.		F_124	<i>Stolephorus commersonii</i>	BOLD:AAB7979
88.		F_127	<i>Siganus javus</i>	BOLD:AAF4032
89.		F_128	<i>Stolephorus baganensis</i>	BOLD:ADG4839
90.		F_129	<i>Gonialosa manmina</i>	BOLD:ABY2938
91.		F_130	<i>Strongylura strongylura</i>	BOLD:AAD4770
92.		F_131	<i>Gerres limbatus</i>	BOLD:AAC0383
93.		F_136	<i>Eleotris melanosoma</i>	BOLD:ACV9049
94.		F_138	<i>Atherinomorus duodecimalis</i>	BOLD:ADJ5771
95.		F_139	<i>Elops machnata</i>	BOLD:AAB9386
96.		F_140	<i>Planiliza macrolepis</i>	BOLD:ADJ8384
97.		F_141	<i>Platycephalus indicus</i>	BOLD:AAF1425
98.		F_142	<i>Thryssa purava</i>	BOLD:AAE7811
99.		F_143	<i>Gerres macracanthus</i>	BOLD:AAC0383
100.		F_147	<i>Carangoides praeustus</i>	BOLD:AAH6462
101.		F_148	<i>Rhabdosargus sarba</i>	BOLD:AAC4119
102.		F_153	<i>Thryssa polybranchialis</i>	BOLD:ADJ9879
103.		F_156	<i>Eleotris melanosoma</i>	BOLD:ACV9049
104.		F_165	<i>Macrognahtus pancalus</i>	BOLD:AAF5455
105.		F_169	<i>Stolephorus indicus</i>	BOLD:ADG4839
106.		F_177	<i>Pelates quadrilineatus</i>	BOLD:AAA9700
107.		F_178	<i>Ambassis ambassis</i>	BOLD:ACJ3337
108.		F_182	<i>Etroplus suratensis</i>	BOLD:AAF3969
109.		F_203	<i>Pisodonophis boro</i>	BOLD:ADK4187
110.		F_205	<i>Anabas cobojius</i>	BOLD:ABA9363
111.		F_208	<i>Thryssa purava</i>	BOLD:AAE7811
112.		F_209	<i>Triacanthus nieuhofii</i>	BOLD:ADI2430
113.		F_210	<i>Triacanthus nieuhofii</i>	BOLD:ADI2430
114.		F_213	<i>Butis gymnopus</i>	BOLD:ADJ9396
115.		F_214	<i>Ambassis gymnocephalus</i>	BOLD:AAJ2348
116.		F_220	<i>Cynoglossus puncticeps</i>	BOLD:AAE3000
117.		F_222	<i>Glossogobius giuris</i>	BOLD:ACV9049
118.		F_245	<i>Psammogobius biocellatus</i>	BOLD:ADK3380
119.	DNA barcoding of ornamental Fishes of India	ZSI_MRF1	<i>Barilius bendelisis</i>	BOLD:ADG1636
120.		ZSI_MRF2	<i>Barilius bendelisis</i>	BOLD:ADG1636
121.		ZSI_MRF3	<i>Barilius bendelisis</i>	BOLD:ADG1636
122.		ZSI_MRF4	<i>Barilius bendelisis</i>	BOLD:ADG1636
123.		ZSI_MRF5	<i>Barilius bendelisis</i>	BOLD:ADG1636

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
124.		ZSI_MRF6	<i>Barilius bendelisis</i>	BOLD:ADG1636
125.		ZSI_MRF7	<i>Barilius bendelisis</i>	BOLD:ADG1636
126.		ZSI_MRF8	<i>Mystus bleekeri</i>	BOLD:AAZ9696
127.		ZSI_MRF9	<i>Mystus bleekeri</i>	BOLD:AAZ9696
128.		ZSI_MRF10	<i>Channa punctata</i>	BOLD:AAE8814
129.		ZSI_MRF12	<i>Channa gachua</i>	BOLD:ACH0185
130.		ZSI_MRF13	<i>Mastacembelus armatus</i>	BOLD:ACA0142
131.		ZSI_MRF14	<i>Mastacembelus armatus</i>	BOLD:ACA0142
132.		ZSI_MRF15	<i>Clarias magur</i>	BOLD:AAM1926
133.		ZSI_MRF17	<i>Opsarius barna</i>	BOLD:ACH1400
134.		ZSI_MRF18	<i>Pethia ticto</i>	BOLD:AAZ3076
135.		ZSI_MRF19	<i>Chagunius chagunio</i>	BOLD:AAZ5053
136.		ZSI_MRF24	<i>Barilius bendelisis</i>	BOLD:ADG1636
137.		ZSI_MRF25	<i>Barilius bendelisis</i>	BOLD:ADG1636
138.		ZSI_MRF27	<i>Channa punctata</i>	BOLD:AAE8814
139.		ZSI_MRF30	<i>Rasbora daniconius</i>	BOLD:ABX6594
140.		ZSI_MRF31	<i>Rasbora daniconius</i>	BOLD:ABX6594
141.		ZSI_MRF32	<i>Danio dangila</i>	BOLD:AAU1054
142.		ZSI_MRF33	<i>Danio dangila</i>	BOLD:AAU1054
143.		ZSI_MRF34	<i>Danio dangila</i>	BOLD:AAU1054
144.		ZSI_MRF35	<i>Danio dangila</i>	BOLD:AAU1054
145.		ZSI_MRF26	<i>Barilius bendelisis</i>	BOLD:ADG1636
146.	Barcoding Spiders of India	AA_693	<i>Heteropoda venetoria</i>	BOLD:ADI4532
147.		AA_750	<i>Heteropoda venetoria</i>	BOLD:ADI2696
148.		AA_806	<i>Gasteracantha cf. diadasmia</i>	BOLD:ADA2059
149.		AA_857	<i>Yaginumaella cf. incognita</i>	BOLD:ADI2630
150.		AA_870	<i>Cyclosa mulmeinensis</i>	BOLD:AAK2560
151.		AA_905	<i>Synagelides cf. kosi</i>	BOLD:ADI5002
152.		AA_907	<i>Yaginumaella incognita</i>	BOLD:ADI2821
153.		AA_909	<i>Cyclosa spirifera</i>	BOLD:ADJ4403
154.		AA_966	<i>Camaricus cf. formosus</i>	BOLD:ADG6782
155.		AA_970	<i>Camaricus cf. formosus</i>	BOLD:ADG6782
156.		AA_974	<i>Phintella cf. vittata</i>	BOLD:ADI5208
157.		AA_1056	<i>Yaginumaella incognita</i>	BOLD:ADI2821
158.		AA_1190	<i>Argiope pulchella</i>	BOLD:ACG0576
159.		AA_1385	<i>Chalcotropis pennata</i>	BOLD:ADO5715
160.		AA_1398	<i>Wadicosa fidelis</i>	BOLD:AAG7456
161.		AA_1399	<i>Wadicosa ghatika</i>	BOLD:ADO6193
162.		AA_1810	<i>Harmochirus exaggeratus</i>	BOLD:ADN2339
163.		AA_1811	<i>Harmochirus exaggeratus</i>	BOLD:ADN2340
164.		AA_1817	<i>Chrysilla volupe</i>	BOLD:ADN3848

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
165.	Lepidoptera of Indian Himalaya	NMH_2563	<i>Banisia fenestrifera</i>	BOLD:ADM9115
166.		NMH_2564	<i>Dysgonia crameri</i>	BOLD:ADM7727
167.		NMH_2566	<i>Biston suppressaria</i>	BOLD:AAM4227
168.		NMH_2567	<i>Biston suppressaria</i>	BOLD:AAM4227
169.		NMH_2568	<i>Calyptra ophideroides</i>	BOLD:ADM7033
170.		NMH_2569	<i>Calyptra ophideroides</i>	BOLD:ADM7033
171.		NMH_2571	<i>Cretonotos transiens</i>	BOLD:AAE9516
172.		NMH_2577	<i>Haritalodes derogata</i>	BOLD:ACB6684
173.		NMH_2578	<i>Trachea melanospila</i>	BOLD:AAD3371
174.		NMH_2585	<i>Numenes patrana</i>	BOLD:ACR9526
175.		NMH_2586	<i>Diarsia nigrosigna</i>	BOLD:ABV4813
176.		NMH_2588	<i>Diarsia nigrosigna</i>	BOLD:ABV4813
177.		NMH_2592	<i>Diarsia nigrosigna</i>	BOLD:ABV4813
178.		NMH_2593	<i>Trachea guttata</i>	BOLD:ADM8783
179.		NMH_2594	<i>Problepsis albidior</i>	BOLD:AAZ6198
180.		NMH_2595	<i>Leucinodes orbonalis</i>	BOLD:AAE7334
181.		NMH_2597	<i>Cladarctia quadriramosa</i>	BOLD:ACA2668
182.		NMH_2599	<i>Lymantria serva</i>	BOLD:ADM8627
183.		NMH_2603	<i>Theretra oldenlandiae</i>	BOLD:ADM8627
184.		NMH_2605	<i>Stigmatomorpha palmata</i>	BOLD:ADM8365
185.		NMH_2606	<i>Pericallia ricini</i>	BOLD:ADM8963
186.		NMH_2607	<i>Asota caricae</i>	BOLD:ACE4742
187.		NMH_2608	<i>Eupterote fabia</i>	BOLD:ABA5713
188.		NMH_2611	<i>Biston suppressaria</i>	BOLD:AAM4227
189.		NMH_2615	<i>Dysgonia arctotaenia</i>	BOLD:ADM8094
190.		NMH_2619	<i>Theretra oldenlandiae</i>	BOLD:AAI0874
191.		NMH_2620	<i>Cretonotos transiens</i>	BOLD:AAE9516
192.		NMH_2626	<i>Spodoptera litura</i>	BOLD:AAA8626
193.		NMH_2629	<i>Stigmatomorpha palmata</i>	BOLD:ADM8365
194.		NMH_2630	<i>Stigmatomorpha sp.</i>	BOLD:AAZ6936
195.		NMH_2633	<i>Trigonodes hyppasia</i>	BOLD:AAA8493
196.		NMH_2634	<i>Dysgonia analis</i>	BOLD:ADM7727
197.		NMH_2636	<i>Macrobrochis gigas</i>	BOLD:ACF5949
198.		NMH_2637	<i>Aedia leucomelas</i>	BOLD:ADM7093
199.		NMH_2644	<i>Trigonodes hyppasia</i>	BOLD:AAA8493
200.		NMH_2647	<i>Cretonotos transiens</i>	BOLD:AAE9516
201.		NMH_2650	<i>Cretonotos transiens</i>	BOLD:AAE9516
202.		NMH_2656	<i>Oraesia emarginata</i>	BOLD:AAN4597
203.		NMH_2657	<i>Stigmatomorpha sp.</i>	BOLD:AAZ6936
204.		NMH_2662	<i>Cretonotos transiens</i>	BOLD:ADM8082
205.		NMH_2663	<i>Asota ficus</i>	BOLD:AAE6434

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
206.		NMH_2665	<i>Asota caricae</i>	BOLD:ACE4742
207.		NMH_2666	<i>Cretonotos transiens</i>	BOLD:AAE9516
208.		NMH_2671	<i>Dichromia trigonalis</i>	BOLD:ADM7453
209.		NMH_2676	<i>Leopa katinka</i>	BOLD:AAB0772
210.		NMH_2678	<i>Leopa katinka</i>	BOLD:ADM8833
211.		NMH_2679	<i>Leopa schintlemeisteri</i>	BOLD:AAC9506
212.		NMH_2680	<i>Leopa diffunoccidentalis</i>	BOLD:ADG8524
213.		NMH_2681	<i>Leopa diffunoccidentalis</i>	BOLD:AAC9506
214.		NMH_2682	<i>Leopa diffunoccidentalis</i>	BOLD:AAC9506
215.		NMH_2683	<i>Leopa diffunoccidentalis</i>	BOLD:AAC9506
216.		NMH_2684	<i>Argema maenas</i>	BOLD:AAB9593
217.		NMH_2685	<i>Argema maenas diana</i>	BOLD:AAB9593
218.		NMH_2687	<i>Argema maenas</i>	BOLD:AAB9593
219.		NMH_3000	<i>Aglaomorpha plagiata</i>	BOLD:ABX1884
220.		NMH_3040	<i>Alphaea fulvohirta</i>	BOLD:AAH4623
221.		NMH_3075	<i>Cretonotos transiens</i>	BOLD:AAE9516
222.		NMH_3078	<i>Cretonotos transiens</i>	BOLD:AAE9516
223.		NMH_3080	<i>Cretonotos transiens</i>	BOLD:AAE9516
224.		NMH_3082	<i>Cretonotos transiens</i>	BOLD:AAE9516
225.		NMH_3083	<i>Cretonotos transiens</i>	BOLD:AAE9516
226.		NMH_3256	<i>Cyana puer</i>	BOLD:ADM8615
227.	Barcoding Bees of Himalayas	BEH_9	<i>Apis cerana</i>	BOLD:AAM5455
228.		BEH_11	<i>Halictus vicinus</i>	BOLD:AAQ3034
229.		BEH_12	<i>Halictus vicinus</i>	BOLD:AAQ3034
230.		BEH_13	<i>Halictus vicinus</i>	BOLD:AAQ3034
231.		BEH_14	<i>Halictus vicinus</i>	BOLD:AAQ3034
232.		BEH_15	<i>Halictus vicinus</i>	BOLD:AAQ3034
233.		BEH_16	<i>Halictus vicinus</i>	BOLD:AAQ3034
234.		BEH_17	<i>Halictus vicinus</i>	BOLD:AAQ3034
235.		BEH_18	<i>Halictus vicinus</i>	BOLD:AAQ3034
236.		BEH_19	<i>Halictus vicinus</i>	BOLD:AAQ3034
237.		BEH_20	<i>Halictus vicinus</i>	BOLD:AAQ3034
238.		BEH_21	<i>Halictus vicinus</i>	BOLD:AAQ3034
239.		BEH_22	<i>Halictus vicinus</i>	BOLD:AAQ3034
240.		BEH_23	<i>Halictus vicinus</i>	BOLD:AAQ3034
241.		BEH_25	<i>Halictus vicinus</i>	BOLD:AAQ3034
242.		BEH_26	<i>Halictus vicinus</i>	BOLD:AAQ3034
243.		BEH_28	<i>Halictus vicinus</i>	BOLD:AAQ3034
244.		BEH_29	<i>Apis laboriosa</i>	BOLD:ADR6860
245.		BEH_30	<i>Halictus vicinus</i>	BOLD:AAQ3034
246.		BEH_31	<i>Halictus vicinus</i>	BOLD:AAQ3034

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
247.		BEH_32	<i>Halictus vicinus</i>	BOLD:AAQ3034
248.		BEH_33	<i>Halictus vicinus</i>	BOLD:AAQ3034
249.		BEH_34	<i>Halictus vicinus</i>	BOLD:AAQ3034
250.		BEH_35	<i>Halictus vicinus</i>	BOLD:AAQ3034
251.		BEH_36	<i>Halictus vicinus</i>	BOLD:AAQ3034
252.		BEH_37	<i>Halictus vicinus</i>	BOLD:AAQ3034
253.		BEH_39	<i>Halictus vicinus</i>	BOLD:AAQ3034
254.		BEH_40	<i>Halictus vicinus</i>	BOLD:AAQ3034
255.		BEH_41	<i>Halictus vicinus</i>	BOLD:AAQ3034
256.		BEH_42	<i>Halictus vicinus</i>	BOLD:AAQ3034
257.		BEH_43	<i>Halictus vicinus</i>	BOLD:AAQ3034
258.		BEH_44	<i>Halictus vicinus</i>	BOLD:AAQ3034
259.		BEH_45	<i>Halictus vicinus</i>	BOLD:AAQ3034
260.		BEH_46	<i>Halictus vicinus</i>	BOLD:AAQ3034
261.		BEH_47	<i>Halictus vicinus</i>	BOLD:AAQ3034
262.		BEH_48	<i>Halictus vicinus</i>	BOLD:AAQ3034
263.		BEH_51	<i>Halictus vicinus</i>	BOLD:AAQ3034
264.		BEH_52	<i>Halictus vicinus</i>	BOLD:AAQ3034
265.		BEH_53	<i>Halictus vicinus</i>	BOLD:AAQ3034
266.		BEH_54	<i>Halictus vicinus</i>	BOLD:AAQ3034
267.		BEH_55	<i>Halictus vicinus</i>	BOLD:AAQ3034
268.		BEH_56	<i>Halictus vicinus</i>	BOLD:AAQ3034
269.		BEH_59	<i>Halictus vicinus</i>	BOLD:AAQ3034
270.		BEH_60	<i>Halictus vicinus</i>	BOLD:AAQ3034
271.		BEH_61	<i>Halictus vicinus</i>	BOLD:AAQ3034
272.		BEH_62	<i>Halictus vicinus</i>	BOLD:AAQ3034
273.		BEH_63	<i>Halictus vicinus</i>	BOLD:AAQ3034
274.		BEH_64	<i>Halictus vicinus</i>	BOLD:AAQ3034
275.		BEH_65	<i>Halictus vicinus</i>	BOLD:ADR9286
276.		BEH_66	<i>Halictus vicinus</i>	BOLD:AAQ3034
277.		BEH_68	<i>Halictus vicinus</i>	BOLD:AAQ3034
278.		BEH_69	<i>Halictus vicinus</i>	BOLD:AAQ3034
279.		BEH_70	<i>Halictus vicinus</i>	BOLD:AAQ3034
280.		BEH_71	<i>Halictus vicinus</i>	BOLD:AAQ3034
281.		BEH_72	<i>Halictus vicinus</i>	BOLD:AAQ3034
282.		BEH_73	<i>Halictus vicinus</i>	BOLD:AAQ3034
283.		BEH_74	<i>Halictus vicinus</i>	BOLD:AAQ3034
284.		BEH_75	<i>Halictus vicinus</i>	BOLD:AAQ3034
285.		BEH_76	<i>Halictus vicinus</i>	BOLD:AAQ3034
286.		BEH_77	<i>Halictus vicinus</i>	BOLD:AAQ3034
287.		BEH_78	<i>Halictus vicinus</i>	BOLD:AAC6447

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
288.		BEH_79	<i>Halictus vicinus</i>	BOLD:AAQ3034
289.		BEH_80	<i>Xylocopa nasalis</i>	BOLD:ADR9286
290.		BEH_81	<i>Xylocopa nasalis</i>	BOLD:ACW2003
291.		BEH_82	<i>Xylocopa nasalis</i>	BOLD:ACW2003
292.		BEH_83	<i>Xylocopa nasalis</i>	BOLD:ACW2003
293.		BEH_84	<i>Apis laboriosa</i>	BOLD:ADR6860
294.		BEH_86	<i>Bombus haemorrhoidalis</i>	BOLD:ACW2003
295.		BEH_87	<i>Bombus haemorrhoidalis</i>	BOLD:AAC6447
296.		BEH_89	<i>Bombus haemorrhoidalis</i>	BOLD:AAC6447
297.		BEH_90	<i>Bombus haemorrhoidalis</i>	BOLD:AAC6447
298.		BEH_91	<i>Bombus haemorrhoidalis</i>	BOLD:AAC6447
299.		BEH_118	<i>Bombus abnormis</i>	BOLD:ADR4409
300.		BEH_119	<i>Bombus pyrosoma</i>	BOLD:ADL1736
301.		BEH_120	<i>Bombus pyrosoma</i>	BOLD:ADR4409
302.		BEH_124	<i>Apis cerana</i>	BOLD:AAM5455
303.		BEH_126	<i>Apis cerana</i>	BOLD:AAM5455
304.		BEH_128	<i>Xylocopa tranquebarica</i>	BOLD:AAF9678
305.		BEH_129	<i>Xylocopa acutipennis</i>	BOLD:ADR8524
306.		BEH_132	<i>Apis cerana</i>	BOLD:AAM5455
307.		BEH_133	<i>Apis cerana</i>	BOLD:AAM5455
308.		BEH_134	<i>Apis cerana</i>	BOLD:AAM5455
309.		BEH_135	<i>Apis cerana</i>	BOLD:AAM5455
310.		BEH_136	<i>Apis cerana</i>	BOLD:AAM5455
311.		BEH_137	<i>Tetralonioidella himalayana</i>	BOLD:ADR4062
312.		BEH_138	<i>Bombus eximius</i>	BOLD:AAI8697
313.		BEH_139	<i>Bombus eximius</i>	BOLD:AAC6447
314.		BEH_140	<i>Bombus haemorrhoidalis</i>	BOLD:ADL6072
315.		BEH_141	<i>Bombus haemorrhoidalis</i>	BOLD:ADR8182
316.		BEH_142	<i>Amegilla himalajensis</i>	BOLD:AAM5455
317.		BEH_143	<i>Apis cerana</i>	BOLD:ADR9434
318.		BEH_148	<i>Lepidotrigona arcifera</i>	BOLD:ADR9434
319.		BEH_149	<i>Lepidotrigona arcifera</i>	BOLD:ADR9434
320.		BEH_150	<i>Lepidotrigona arcifera</i>	BOLD:ADR9434
321.		BEH_152	<i>Lepidotrigona arcifera</i>	BOLD:ADR9434
322.		BEH_153	<i>Lepidotrigona arcifera</i>	BOLD:AAI8697
323.		BEH_154	<i>Lepidotrigona arcifera</i>	BOLD:ADR9434
324.		BEH_155	<i>Lepidotrigona arcifera</i>	BOLD:ADR9434
325.		BEH_156	<i>Lepidotrigona arcifera</i>	BOLD:ADR9434
326.		BEH_157	<i>Lepidotrigona arcifera</i>	BOLD:ADR9434
327.		NMH2770	<i>Amegilla calceifera</i>	BOLD:ACV4492
328.		NMH2775	<i>Bombus haemorrhoidalis</i>	BOLD:AAC6447

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
329.		NMH2777	<i>Megachile stulta</i>	BOLD:ACX6010
330.		NMH2779	<i>Nomia thoracica</i>	BOLD:AAI7401
331.		NMH2783	<i>Apis cerana</i>	BOLD:AAM5455
332.		NMH2785	<i>Megachile umbripennis</i>	BOLD:AAJ3003
333.		NMH2786	<i>Megachile impressa</i>	BOLD:AAK6930
334.		NMH2788	<i>Amegilla calceifera</i>	BOLD:ACV4492
335.		NMH2789	<i>Amegilla cingulifera</i>	BOLD:AAJ2255
336.		NMH2791	<i>Apis dorsata</i>	BOLD:AAA2327
337.		NMH2793	<i>Ceratina sutepensis</i>	BOLD:AAM5578
338.		NMH2795	<i>Ceratina sutepensis</i>	BOLD:AAM5578
339.		NMH2798	<i>Nomia incerta</i>	BOLD:AAE1639
340.		NMH2803	<i>Megachile umbripennis</i>	BOLD:AAJ3003
341.		NMH2809	<i>Ceratina hieroglyphica</i>	BOLD:ABZ6602
342.		NMH2811	<i>Ceratina sutepensis</i>	BOLD:AAM5578
343.		NMH2812	<i>Amegilla cingulifera</i>	BOLD:ADL7447
344.		NMH2813	<i>Amegilla cingulifera</i>	BOLD:ADL7447
345.		NMH2816	<i>Apis cerana</i>	BOLD:AAM5455
346.		NMH2817	<i>Bombus trifasciatus</i>	BOLD:ADL6071
347.		NMH2823	<i>Lasioglossum sp.</i>	BOLD:ADL9143
348.		NMH2824	<i>Nomia crassipes</i>	BOLD:AAQ3031
349.		NMH2827	<i>Thyreus himalayensis</i>	BOLD:ACV4821
350.		NMH2828	<i>Amegilla cingulifera</i>	BOLD:ADL7447
351.		NMH2829	<i>Nomia incerta</i>	BOLD:AAE1639
352.		NMH2832	<i>Xylocopa fenestrata</i>	BOLD:AAE4670
353.		NMH2833	<i>Xylocopa fenestrata</i>	BOLD:AAE4670
354.		NMH2834	<i>Xylocopa fenestrata</i>	BOLD:AAE4670
355.		NMH2835	<i>Xylocopa fenestrata</i>	BOLD:AAE4670
356.		NMH2838	<i>Amegilla himalajensis</i>	BOLD:ADL6680
357.		NMH2842	<i>Thyreus himalayensis</i>	BOLD:ACV4821
358.		NMH2844	<i>Amegilla cingulifera</i>	BOLD:AAJ2255
359.		NMH2845	<i>Apis andreniformis</i>	BOLD:AAC5729
360.		NMH2846	<i>Nomia incerta</i>	BOLD:AAE1639
361.		NMH2848	<i>Nomia crassipes</i>	BOLD:AAQ3031
362.		NMH2850	<i>Apis dorsata</i>	BOLD:AAA2327
363.		NMH2854	<i>Megachile faceta</i>	BOLD:AAX3240
364.		NMH2855	<i>Bombus trifasciatus</i>	BOLD:ADL6072
365.		NMH2858	<i>Amegilla cingulifera</i>	BOLD:ADL7447
366.		NMH2860	<i>Apis dorsata</i>	BOLD:AAA2327
367.		NMH2871	<i>Lasioglossum sp.</i>	BOLD:ACY5892
368.		NMH2873	<i>Thyreus himalayensis</i>	BOLD:ACV4821
369.		NMH2874	<i>Amegilla himalajensis</i>	BOLD:ADL6680

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
370.	Barcoding Thrips of India	NMH2879	<i>Bombus haemorrhoidalis</i>	BOLD:AAC6447
371.		NMH2882	<i>Amegilla himalajensis</i>	BOLD:ADL6680
372.		TH-960	<i>Thrips alatus</i>	BOLD:AAN6625
373.		TH-2545	<i>Agalmothrips parviceps</i>	BOLD:ADN6807
374.		TH-1256	<i>Indothrips bhushani</i>	BOLD:ADH6680
375.		TH-1676	<i>Aeolothrips intermedius</i>	BOLD:AAZ8618
376.		TH-1492	<i>Thrips hawaiiensis</i>	BOLD:AAZ8516
377.		TH-1594	<i>Aeolothrips distinctus</i>	BOLD:ACY8456
378.		TH-1833	<i>Microcephalothrips abdominalis</i>	BOLD:AAI0410
379.		TH-1447	<i>Exothrips cephalicus</i>	BOLD:ADE1338
380.		TH-2542	<i>Idiothrips bellus</i>	BOLD:ACY9602
381.		TH-1482	<i>Exothrips ornus</i>	BOLD:ACY8436
382.		TH-1877	<i>Haplothrips bagnalli</i>	BOLD:ADH4292
383.		TH-1612	<i>Craspedothrips minor</i>	BOLD:ADM2505
384.		TH-1677	<i>Aeolothrips intermedius</i>	BOLD:AAZ8618
385.		TH-1769	<i>Florithrips traegardhi</i>	BOLD:AAN9111
386.		TH_1588	<i>Tusothrips sumatrensis</i>	BOLD:ACY9997
387.		TH-1915	<i>Aeolothrips intermedius</i>	BOLD:AAZ8618
388.		TH-1881	<i>Aeolothrips intermedius</i>	BOLD:AAZ8618
389.		TH_1753	<i>Anaphothrips obscurus</i>	BOLD:AAQ0558
390.		TH-1907	<i>Frankliniella schultzei</i>	BOLD:AAN6620
391.		TH_1611	<i>Craspedothrips minor</i>	BOLD:ADM2505
392.		TH-1916	<i>Aeolothrips intermedius</i>	BOLD:AAZ8618
393.		TH_1776	<i>Caliothrips graminicola</i>	BOLD:ADM0406
394.		TH_1986	<i>Mycterothrips nilgiriensis</i>	BOLD:ACY8466
395.		TH-1904	<i>Frankliniella schultzei</i>	BOLD:AAN6620
396.		TH_917	<i>Dolichothrips citripes</i>	BOLD:ACV7278
397.		TH_2541	<i>Idiothrips bellus</i>	BOLD:ACY9602
398.		TH-1729	<i>Megalurothrips usitatus</i>	BOLD:AAM8053
399.		TH_1418	<i>Aeolothrips intermedius</i>	BOLD:AAZ8618
400.		TH-1856	<i>Anaphothrips sudanensis</i>	BOLD:AAV3388
401.		TH-1830	<i>Haplothrips andresi</i>	BOLD:AAN5799
402.		TH_1495	<i>Thrips hawaiiensis</i>	BOLD:AAZ8516
403.		TH-1728	<i>Megalurothrips usitatus</i>	BOLD:AAM8053
404.		TH_1551	<i>Thrips hawaiiensis</i>	BOLD:AAZ8516
405.		TH-1905	<i>Frankliniella schultzei</i>	BOLD:AAN6620
406.		TH_1614	<i>Microcephalothrips abdominalis</i>	BOLD:AAI0410
407.		TH-1906	<i>Frankliniella schultzei</i>	BOLD:AAN6620
408.		TH_1917	<i>Rhipiphorothrips cruentatus</i>	BOLD:ACY9953
409.		TH_2021	<i>Neohydatothrips plumeria</i>	BOLD:ACZ0079
410.		TH_2091	<i>Trichromothrips assamensis</i>	BOLD:ADO2298

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
411.		TH_2093	<i>Thrips parvispinus</i>	BOLD:AAM8085
412.		TH_2095	<i>Thrips parvispinus</i>	BOLD:AAM8085
413.		TH_2098	<i>Neohydatothrips plumeria</i>	BOLD:ACZ0079
414.		TH_2102	<i>Scirtothrips hitam</i>	BOLD:ADM0816
415.		TH_2176A	<i>Xylaplothrips debilis</i>	BOLD:ADM5477
416.		TH_2189	<i>Craspedothrips minor</i>	BOLD:ADM2505
417.		TH_2230	<i>Frankliniella occidentalis</i>	BOLD:AAB8717
418.		TH_2235A	<i>Thrips palmi</i>	BOLD:AD01399
419.		TH_2245	<i>Thrips palmi</i>	BOLD:AAE7913
420.		TH_2306A	<i>Thrips palmi</i>	BOLD:AAE7913
421.		TH_2314	<i>Frankliniella occidentalis</i>	BOLD:AAB8717
422.		TH_2321A	<i>Thrips palmi</i>	BOLD:ACN6317
423.		TH_2326	<i>Mymarothrips garuda</i>	BOLD:ACL6651
424.		TH_2327	<i>Franklinothrips megalops</i>	BOLD:ACM2095
425.		TH_2328	<i>Mymarothrips garuda</i>	BOLD:ACL6651
426.		TH_2329	<i>Zaniothrips ricini</i>	BOLD:ADN6478
427.		TH_2330	<i>Mymarothrips garuda</i>	BOLD:ACL6651
428.		TH_2331	<i>Mymarothrips garuda</i>	BOLD:ACL6651
429.		TH_2338	<i>Frankliniella occidentalis</i>	BOLD:AAB8717
430.		TH_2339	<i>Frankliniella occidentalis</i>	BOLD:AAB8717
431.		TH_2340	<i>Frankliniella occidentalis</i>	BOLD:AAB8717
432.		TH_2344	<i>Thrips apicatus</i>	BOLD:AAY6262
433.		TH_2348	<i>Scirtothrips dorsalis</i>	BOLD:ACV7644
434.		TH_2349	<i>Thrips apicatus</i>	BOLD:AAY6262
435.		TH_2350	<i>Megalurothrips usitatus</i>	BOLD:AAM8053
436.		TH_2351	<i>Megalurothrips usitatus</i>	BOLD:AAM8053
437.		TH_2352	<i>Thrips apicatus</i>	BOLD:AAY6262
438.		TH_2353	<i>Megalurothrips typicus</i>	BOLD:ACY7764
439.		TH_2357	<i>Frankliniella schultzei</i>	BOLD:AAM8089
440.		TH_2362	<i>Frankliniella schultzei</i>	BOLD:AAM8089
441.		TH_2367	<i>Haplothrips andresi</i>	BOLD:AAN5799
442.		TH_2372	<i>Selenothrips rubrocinctus</i>	BOLD:ACN6317
443.		TH_2375	<i>Gigantothrips elegans</i>	BOLD:ADN6493
444.		TH_2376	<i>Gigantothrips elegans</i>	BOLD:ADN6493
445.		TH_2380	<i>Scolothrips rhagebianus</i>	BOLD:AAZ8517
446.		TH_2401	<i>Aeolothrips collaris</i>	BOLD:AAZ8619
447.		TH_2424	<i>Thrips palmi</i>	BOLD:ADM4550
448.		TH_2429	<i>Gigantothrips elegans</i>	BOLD:ADN6493
449.		TH_2430	<i>Gigantothrips elegans</i>	BOLD:ADN6493
450.		TH_2532	<i>Indothrips bhushani</i>	BOLD:ADH6680
451.		TH_2533	<i>Rhipiphorothrips cruentatus</i>	BOLD:ACY9953

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
452.		TH_2546	<i>Agalmothrips parviceps</i>	BOLD:ADN6807
453.		TH_2551	<i>Astrothrips stannardi</i>	BOLD:ADE3953
454.		TH_1242	<i>Aeolothrips intermedius</i>	BOLD:AAZ8618
455.		TH_1417	<i>Caliothrips indicus</i>	BOLD:ACY7911
456.		TH_1401	<i>Diarthrothrips nimbus</i>	BOLD:ACP4916
457.		TH_1399	<i>Diarthrothrips nimbus</i>	BOLD:ACP4916
458.		TH_1402	<i>Kurtomathrips morrilli</i>	BOLD:ADH3833
459.		TH_1367	<i>Scirtothrips oligochaetus</i>	BOLD:AAZ8518
460.		TH_1370	<i>Frankliniella schultzei</i>	BOLD:AAN6620
461.		TH_1383	<i>Haplothrips nigricornis</i>	BOLD:ADH4292
462.		TH_1408	<i>Thrips parvispinus</i>	BOLD:AAM8085
463.		TH_1409	<i>Thrips parvispinus</i>	BOLD:AAM8085
464.		TH_1410	<i>Thrips parvispinus</i>	BOLD:AAM8085
465.		TH_1411	<i>Franklinothrips vespiformis</i>	BOLD:ACD8336
466.		TH_1414	<i>Franklinothrips vespiformis</i>	BOLD:ACD8336
467.		TH_1425	<i>Aeolothrips intermedius</i>	BOLD:AAZ8618
468.		TH_1419	<i>Thrips speratus</i>	BOLD:ADH6639
469.		TH_1421	<i>Caliothrips indicus</i>	BOLD:ACY7911
470.		TH_1424	<i>Caliothrips indicus</i>	BOLD:ACY7911
471.		TH_1429	<i>Frankliniella schultzei</i>	BOLD:AAN6620
472.		TH_1420	<i>Thrips tabaci</i>	BOLD:AAB3870
473.		TH_1344	<i>Odontothrips moringa</i>	BOLD:ADH6172
474.		TH_1428	<i>Frankliniella</i>	BOLD:AAM8089
475.		TH_1446	<i>Trichromothrips similis</i>	BOLD:ADH5858
476.		TH_1565	<i>Thrips hawaiiensis</i>	BOLD:AAZ8516
477.		TH_1501	<i>Thrips palmi</i>	BOLD:AAE7913
478.		TH_1506	<i>Selenothrips rubrocinctus</i>	BOLD:ADR2206
479.		TH_1507	<i>Selenothrips rubrocinctus</i>	BOLD:ADR2206
480.		TH_1510	<i>Thrips hawaiiensis</i>	BOLD:AAZ8516
481.		TH_1511	<i>Thrips hawaiiensis</i>	BOLD:AAZ8516
482.		TH_1512	<i>Frankliniella intonsa</i>	BOLD:AAF6737
483.		TH_1541	<i>Frankliniella schultzei</i>	BOLD:AAN6620
484.		TH_1540	<i>Frankliniella schultzei</i>	BOLD:AAN6620
485.		TH_1539	<i>Frankliniella schultzei</i>	BOLD:AAN6620
486.		TH_1546	<i>Thrips coloratus</i>	BOLD:AAK1804
487.		TH_1548	<i>Chaetanaphothrips orchidii</i>	BOLD:AAP7685
488.		TH_1550	<i>Thrips coloratus</i>	BOLD:AAK1804
489.		TH_1552	<i>Thrips hawaiiensis</i>	BOLD:AAZ8516
490.		TH_1554	<i>Thrips coloratus</i>	BOLD:AAK1804
491.		TH_1559	<i>Frankliniella schultzei</i>	BOLD:AAN6620
492.		TH_1571	<i>Scirtothrips dorsalis</i>	BOLD:ACV7644

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
493.		TH_1587	<i>Haplothrips andresi</i>	BOLD:AAN5799
494.		TH_1585	<i>Haplothrips andresi</i>	BOLD:AAN5799
495.		TH_1586	<i>Haplothrips andresi</i>	BOLD:AAN5799
496.		TH_1515	<i>Haplothrips tenuipennis</i>	BOLD:AAN4488
497.		TH_1572	<i>Scirtothrips oligochaetus</i>	BOLD:AAZ8518
498.		TH_1575	<i>Frankliniella schultzei</i>	BOLD:AAN6620
499.		TH-1673	<i>Thrips apicatus</i>	BOLD:AAY6262
500.		TH_2160	<i>Rhipiphorothrips cruentatus</i>	BOLD:ACY9953
501.		TH_2161	<i>Retithrips syriacus</i>	BOLD:ADL9581
502.		TH_2162	<i>Retithrips syriacus</i>	BOLD:ADL9581
503.		TH_2163	<i>Retithrips syriacus</i>	BOLD:ADL9581
504.		TH_2164	<i>Rhipiphorothrips cruentatus</i>	BOLD:ACY9953
505.		TH_2170	<i>Retithrips syriacus</i>	BOLD:ADL9581
506.		TH_2171	<i>Rhipiphorothrips cruentatus</i>	BOLD:ACY9953
507.		TH_2172	<i>Dendrothripoides innoxius</i>	BOLD:ADE0902
508.		TH_2177	<i>Hoplandrothrips ochraceus</i>	BOLD:ADM4243
509.		TH_2179	<i>Hoplandrothrips ochraceus</i>	BOLD:ADM3981
510.		TH_2180	<i>Hoplandrothrips ochraceus</i>	BOLD:ADM3981
511.		TH_2182	<i>Panchaetothrips indicus</i>	BOLD:ADM3855
512.		TH_2221	<i>Thrips palmi</i>	BOLD:AAE7913
513.		TH_2224	<i>Thrips hawaiiensis</i>	BOLD:AAZ8516
514.		TH_2225	<i>Thrips palmi</i>	BOLD:AAE7913
515.		TH_2226	<i>Thrips palmi</i>	BOLD:AAE7913
516.		TH_2227	<i>Thrips palmi</i>	BOLD:AAE7913
517.		TH_2252	<i>Frankliniella schultzei</i>	BOLD:AAN6620
518.		TH_2256	<i>Thrips palmi</i>	BOLD:AAE7913
519.		TH_2264	<i>Thrips palmi</i>	BOLD:AAE7913
520.		TH_2265	<i>Scirtothrips dorsalis</i>	BOLD:ACV7644
521.		TH_2266	<i>Frankliniella occidentalis</i>	BOLD:AAB8717
522.		TH_2271	<i>Thrips palmi</i>	BOLD:AAE7913
523.		TH_2272	<i>Thrips palmi</i>	BOLD:AAN2747
524.		TH_2273	<i>Thrips palmi</i>	BOLD:AAN2747
525.		TH_2278	<i>Bathrips melanicornis</i>	BOLD:ACI6059
526.		TH_2279	<i>Thrips parvispinus</i>	BOLD:AAM8085
527.		TH_2281	<i>Thrips palmi</i>	BOLD:ACY8465
528.		TH_2282	<i>Thrips palmi</i>	BOLD:AAE7913
529.		TH_2286	<i>Thrips palmi</i>	BOLD:AAE7913
530.		TH_2287	<i>Thrips palmi</i>	BOLD:AAE7913
531.		TH_2288	<i>Thrips palmi</i>	BOLD:AAE7913
532.		TH_2297	<i>Haplothrips gowdeyi</i>	BOLD:AAN5799
533.		TH_2298	<i>Haplothrips gowdeyi</i>	BOLD:AAN5799

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
534.		TH_2306	<i>Thrips palmi</i>	BOLD:AAE7913
535.		TH_2308	<i>Thrips palmi</i>	BOLD:AAE7913
536.		TH_2315	<i>Thrips palmi</i>	BOLD:AAE7913
537.		TH_2316	<i>Thrips palmi</i>	BOLD:AAE7913
538.		TH_2317	<i>Thrips palmi</i>	BOLD:AAE7913
539.		TH_2319	<i>Thrips palmi</i>	BOLD:AAE7913
540.		TH_2176	<i>Xylaplothrips debilis</i>	BOLD:ADM5477
541.		TH_2181	<i>Hoplandrothrips ochraceus</i>	BOLD:ADM3981
542.		TH_2228	<i>Thrips palmi</i>	BOLD:AAN2747
543.		TH_2231	<i>Thrips palmi</i>	BOLD:AAN2747
544.		TH_2232	<i>Thrips palmi</i>	BOLD:AAN2747
545.		TH_2233	<i>Thrips palmi</i>	BOLD:AAN2747
546.		TH_2234	<i>Thrips palmi</i>	BOLD:AAN2747
547.		TH_2235	<i>Thrips palmi</i>	BOLD:AAN2747
548.		TH_2237	<i>Scirtothrips dorsalis</i>	BOLD:ACV7644
549.		TH_2239	<i>Frankliniella schultzei</i>	BOLD:AAN6620
550.		TH_2243	<i>Thrips palmi</i>	BOLD:AAN2747
551.		TH_2244	<i>Scirtothrips dorsalis</i>	BOLD:ACV7644
552.		TH_2246	<i>Frankliniella schultzei</i>	BOLD:AAN6620
553.		TH_2247	<i>Frankliniella schultzei</i>	BOLD:AAN6620
554.		TH_2248	<i>Thrips palmi</i>	BOLD:AAN2747
555.		TH_2250	<i>Thrips hawaiiensis</i>	BOLD:AAZ8516
556.		TH_2251	<i>Thrips florum</i>	BOLD:AAP7681
557.		TH_2254	<i>Frankliniella schultzei</i>	BOLD:ADM5736
558.		TH_2255	<i>Frankliniella schultzei</i>	BOLD:AAN6620
559.		TH_2258	<i>Thrips palmi</i>	BOLD:AAN2747
560.		TH_2269	<i>Thrips palmi</i>	BOLD:AAN2747
561.		TH_2270	<i>Thrips palmi</i>	BOLD:AAN2747
562.		TH_2275	<i>Frankliniella occidentalis</i>	BOLD:AAB8717
563.		TH_2277	<i>Thrips palmi</i>	BOLD:AAE7913
564.		TH_2283	<i>Thrips palmi</i>	BOLD:AAN2747
565.		TH_2285	<i>Frankliniella occidentalis</i>	BOLD:AAB8717
566.		TH_2289	<i>Thrips palmi</i>	BOLD:AAN2747
567.		TH_2293	<i>Thrips palmi</i>	BOLD:AAN2747
568.		TH_2295	<i>Thrips palmi</i>	BOLD:AAN2747
569.		TH_2303	<i>Thrips palmi</i>	BOLD:AAN2747
570.		TH_2307	<i>Thrips palmi</i>	BOLD:AAN2747
571.		TH_2318	<i>Frankliniella occidentalis</i>	BOLD:AAB8717
572.		TH_2320	<i>Thrips palmi</i>	BOLD:AAN2747
573.		TH_1679	<i>Asprothrips navsariensis</i>	BOLD:ADM2495
574.		TH_1694	<i>Scolothrips rhagebianus</i>	BOLD:ADM5751

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
575.		TH_1695	<i>Scolothrips rhagebianus</i>	BOLD:ADM5751
576.		TH_1696	<i>Scolothrips rhagebianus</i>	BOLD:ADM5751
577.		TH_1697	<i>Scolothrips rhagebianus</i>	BOLD:ADM5751
578.		TH_1705	<i>Ayyaria chaetophora</i>	BOLD:ADM3629
579.		TH_1706	<i>Tusothrips sumatrensis</i>	BOLD:ACY9997
580.		TH_2003	<i>Ayyaria chaetophora</i>	BOLD:ACZ0116
581.		TH_2059	<i>Thrips simplex</i>	BOLD:ACK3450
582.		TH_2260	<i>Thrips palmi</i>	BOLD:ADM4550
583.		TH_2401A	<i>Aeolothrips collaris</i>	BOLD:AAZ8619
584.		TH_2532A	<i>Indothrips bhushani</i>	BOLD:ADH6680
585.		TH_1854	<i>Astrothrips tumiceps</i>	BOLD:ACY9954
586.		TH_1464	<i>Aeolothrips distinctus</i>	BOLD:ACY8456
587.		TH_1067	<i>Caliothrips indicus</i>	BOLD:ACY7911
588.		TH_1774	<i>Caliothrips graminicola</i>	BOLD:ADM0406
589.		TH_959	<i>Franklinothrips vespiformis</i>	BOLD:ACD8336
590.		TH_1243	<i>Indothrips bhushani</i>	BOLD:ADH6680
591.		TH_1105	<i>Aeolothrips collaris</i>	BOLD:AAZ8619
592.		TH_1066	<i>Caliothrips indicus</i>	BOLD:ACY7911
593.		TH_897	<i>Holarthrothrips indicus</i>	BOLD:ACY8375
594.		TH_1487	<i>Holarthrothrips indicus</i>	BOLD:ACY8375
595.		TH_888	<i>Franklinothrips vespiformis</i>	BOLD:ACD8336
596.		TH_1485	<i>Holarthrothrips indicus</i>	BOLD:ACY8375
597.		TH_1593	<i>Aeolothrips distinctus</i>	BOLD:ACY8456
598.		TH_870	<i>Haplothrips gowdeyi</i>	BOLD:ACZ0203
599.		TH_1840	<i>Plicothrips apicalis</i>	BOLD:AAN6622
600.		TH_1555	<i>Thrips carthami</i>	BOLD:AAP7682
601.		TH_1590	<i>Tusothrips sumatrensis</i>	BOLD:ACY9997
602.		TH_1404	<i>Kurtomathrips morrilli</i>	BOLD:ADH3833
603.		TH_1923	<i>Mycterothrips nilgiriensis</i>	BOLD:AAP7685
604.		TH_1233A	<i>Dyothrips pallescens</i>	BOLD:ACY7630
605.		TH_1125	<i>Neohydatothrips chandrai</i>	BOLD:ACG8261
606.		TH_918	<i>Dolichothrips citripes</i>	BOLD:ACV7278
607.		TH_1989	<i>Mycterothrips nilgiriensis</i>	BOLD:AAP7685
608.		TH_2546A	<i>Agalmothrips parviceps</i>	BOLD:ADN6807
609.		TH_1908	<i>Mycterothrips nilgiriensis</i>	BOLD:AAP7685
610.		TH_1765	<i>Neohydatothrips samayunkur</i>	BOLD:AAP7680
611.		TH_1121	<i>Anaphothrips sudanensis</i>	BOLD:AAV3388
612.		TH_1303	<i>Scirtothrips dorsalis</i>	BOLD:ACV7644
613.		TH_1258A	<i>Stictothrips faueri</i>	BOLD:ADH4389
614.		TH_1240	<i>Hoplandrothrips nobilis</i>	BOLD:ADM2036
615.		TH_1549	<i>Thrips carthami</i>	BOLD:AAP7682

Sl.No.	Name of the Project	Specimen Code	Species Name	BIN
616.		TH_2539	<i>Dolichothrips ochripes</i>	BOLD:ACY9910
617.		TH_1261A	<i>Mycterothrips acaciae</i>	BOLD:ADM6339
618.		TH_1265	<i>Stictothrips faueri</i>	BOLD:ADH4389
619.		TH_1954	<i>Thrips orientalis</i>	BOLD:ACK3450
620.		TH_1261	<i>Mycterothrips acaciae</i>	BOLD:ADM6339
621.		TH_1426	<i>Thrips florum</i>	BOLD:AAP7681
622.		TH_1546B	<i>Thrips coloratus</i>	BOLD:AAK1804
623.		TH_1345	<i>Thrips coloratus</i>	BOLD:AAK1804
624.		TH_965	<i>Neohydatothrips chandrai</i>	BOLD:ACG8261
625.		TH_2508	<i>Bregmatothrips brachycephalus</i>	BOLD:ADO8047
626.		TH_1390	<i>Bregmatothrips brachycephalus</i>	BOLD:ADO8047
627.		TH_1321	<i>Haplothrips gowdeyi</i>	BOLD:ACZ0203
628.		TH_1607	<i>Mycterothrips acaciae</i>	BOLD:ADM6339
629.		TH_2537	<i>Dolichothrips ochripes</i>	BOLD:ACY9910
630.		TH_1445	<i>Chaetanaphothrips orchidii</i>	BOLD:ADO7141
631.		TH_1400	<i>Diarthrothrips nimbus</i>	BOLD:ACP4916
632.		TH_2533A	<i>Rhipiphorothrips cruentatus</i>	BOLD:ACY9953
633.		TH_1634A	<i>Thrips orientalis</i>	BOLD:ACK3450
634.		TH_1542A	<i>Thrips carthami</i>	BOLD:AAP7682
635.		TH_1432	<i>Haplothrips ceylonicus</i>	BOLD:ACY8731
636.		TH_1244	<i>Hoplandrothrips nobilis</i>	BOLD:ADM2036
637.		TH_1377	<i>Alathrips roonwali</i>	BOLD:ADE0520
638.		TH_1834	<i>Thrips subnudula</i>	BOLD:ACY8465
639.		TH_762A	<i>Megalurothrips typicus</i>	BOLD:ACY7764
640.		TH_1445A	<i>Chaetanaphothrips orchidii</i>	BOLD:ADO7141
641.		TH_1376	<i>Thrips florum</i>	BOLD:AAP7681
642.		TH_958	<i>Bathrips melanicornis</i>	BOLD:ACI6059
643.		TH_1457	<i>Thrips speratus</i>	BOLD:ADH6639
644.		TH_1448	<i>Thrips subnudula</i>	BOLD:ACY8465
645.		TH_1597	<i>Haplothrips gowdeyi</i>	BOLD:ACZ0203
646.		TH_1267	<i>Alathrips roonwali</i>	BOLD:ADE0520
647.		TH_1245	<i>Dyothrips pallescens</i>	BOLD:ACY7630
648.		TH_2543	<i>Alerothrips indicus</i>	BOLD:ADE3397

Development of DNA Barcodes:
National Mission on
Himalayan Studies Project

S.No.	NCBI Accession Number/BOLD ID	Animal Group	Species
1.	ZSIV024-18	Mammalia	<i>Ailurus fulgens</i>
2.	ZSIV001-18	Mammalia	<i>Ailurus fulgens</i>
3.	ZSIV002-18	Mammalia	<i>Ailurus fulgens</i>
4.	ZSIV007-18	Mammalia	<i>Ailurus fulgens</i>
5.	ZSIV009-18	Mammalia	<i>Ailurus fulgens</i>
6.	ZSIV025-18	Mammalia	<i>Ailurus fulgens</i>
7.	ZSIV003-18	Mammalia	<i>Ailurus fulgens</i>
8.	ZSIV008-18	Mammalia	<i>Ailurus fulgens</i>
9.	ZSIV004-18	Mammalia	<i>Ailurus fulgens</i>
10.	ZSIV010-18	Mammalia	<i>Ailurus fulgens</i>
11.	ZSIV026-18	Mammalia	<i>Ailurus fulgens</i>
12.	ZSIV005-18	Mammalia	<i>Ailurus fulgens</i>
13.	ZSIV006-18	Mammalia	<i>Ailurus fulgens</i>
14.	ZSIV011-18	Mammalia	<i>Ailurus fulgens</i>
15.	ZSIV027-18	Mammalia	<i>Ailurus fulgens</i>
16.	ZSIV028-18	Mammalia	<i>Ailurus fulgens</i>
17.	ZSIV012-18	Mammalia	<i>Ailurus fulgens</i>
18.	ZSIV013-18	Mammalia	<i>Ailurus fulgens</i>
19.	ZSIV016-18	Mammalia	<i>Ailurus fulgens</i>
20.	ZSIV029-18	Mammalia	<i>Ailurus fulgens</i>
21.	ZSIV014-18	Mammalia	<i>Ailurus fulgens</i>
22.	ZSIV017-18	Mammalia	<i>Ailurus fulgens</i>
23.	ZSIV015-18	Mammalia	<i>Ailurus fulgens</i>
24.	ZSIV030-18	Mammalia	<i>Ailurus fulgens</i>
25.	ZSIV018-18	Mammalia	<i>Ailurus fulgens</i>
26.	ZSIV031-18	Mammalia	<i>Ailurus fulgens</i>
27.	ZSIV019-18	Mammalia	<i>Ailurus fulgens</i>
28.	ZSIV032-18	Mammalia	<i>Ailurus fulgens</i>
29.	ZSIV020-18	Mammalia	<i>Ailurus fulgens</i>
30.	ZSIV033-18	Mammalia	<i>Ailurus fulgens</i>
31.	ZSIV021-18	Mammalia	<i>Ailurus fulgens</i>
32.	ZSIV034-18	Mammalia	<i>Ailurus fulgens</i>
33.	ZSIV035-18	Mammalia	<i>Ailurus fulgens</i>
34.	ZSIV036-18	Mammalia	<i>Ailurus fulgens</i>
35.	ZSIV022-18	Mammalia	<i>Ailurus fulgens</i>
36.	ZSIV037-18	Mammalia	<i>Ailurus fulgens</i>
37.	ZSIV038-18	Mammalia	<i>Ailurus fulgens</i>
38.	ZSIV023-18	Mammalia	<i>Ailurus fulgens</i>
39.	ZSIV039-18	Mammalia	<i>Ailurus fulgens</i>

S.No.	NCBI Accession Number/BOLD ID	Animal Group	Species
40.	ZSIV040-18	Mammalia	<i>Macaca munzala</i>
41.	ZSIV041-18	Mammalia	<i>Macaca munzala</i>
42.	ZSIV042-18	Mammalia	<i>Macaca munzala</i>
43.	ZSIV043-18	Mammalia	<i>Macaca munzala</i>
44.	ZSIV044-18	Mammalia	<i>Macaca munzala</i>
45.	ZSIV045-18	Mammalia	<i>Macaca munzala</i>
46.	ZSIV046-18	Mammalia	<i>Macaca munzala</i>
47.	ZSIV047-18	Mammalia	<i>Macaca munzala</i>
48.	ZSIV048-18	Mammalia	<i>Macaca munzala</i>
49.	ZSIV049-18	Mammalia	<i>Macaca munzala</i>
50.	ZSIV050-18	Mammalia	<i>Macaca munzala</i>
51.	ZSIVP001-18	Mammalia	<i>Manis pentadactyla</i>
52.	ZSIVP002-18	Mammalia	<i>Manis pentadactyla</i>
53.	ZSIVP003-18	Mammalia	<i>Manis pentadactyla</i>
54.	ZSIVP004-18	Mammalia	<i>Manis pentadactyla</i>
55.	ZSIVP005-18	Mammalia	<i>Manis pentadactyla</i>
56.	ZSIVP006-18	Mammalia	<i>Manis pentadactyla</i>
57.	ZSIVP007-18	Mammalia	<i>Manis pentadactyla</i>
58.	ZSIVP008-18	Mammalia	<i>Manis pentadactyla</i>
59.	ZSIVP009-18	Mammalia	<i>Manis pentadactyla</i>
60.	ZSIVP010-18	Mammalia	<i>Manis pentadactyla</i>
61.	ZSIVP011-18	Mammalia	<i>Manis pentadactyla</i>
62.	ZSIVP012-18	Mammalia	<i>Manis pentadactyla</i>
63.	ZSIVP013-18	Mammalia	<i>Manis pentadactyla</i>
64.	ZSIVP014-18	Mammalia	<i>Manis pentadactyla</i>
65.	ZSIVP015-18	Mammalia	<i>Manis pentadactyla</i>
66.	ZSIVP016-18	Mammalia	<i>Manis pentadactyla</i>
67.	ZSIVP017-18	Mammalia	<i>Manis pentadactyla</i>
68.	ZSIVP018-18	Mammalia	<i>Manis pentadactyla</i>
69.	ZSIVP019-18	Mammalia	<i>Manis pentadactyla</i>
70.	ZSIVP020-18	Mammalia	<i>Manis pentadactyla</i>
71.	ZSIVP021-18	Mammalia	<i>Manis pentadactyla</i>
72.	ZSIVP022-18	Mammalia	<i>Manis pentadactyla</i>
73.	ZSIVP023-18	Aves	<i>Amaurornis akool.</i>
74.	ZSIVP025-18	Aves	<i>Lanius Schach bentet</i>
75.	ZSIVP026-18	Aves	<i>Upupa epops.</i>
76.	ZSIVP027-18	Aves	<i>Accipiter badius</i>
77.	ZSIVP028-18	Actinopterygii	<i>Macrognathus pancalus.</i>
78.	ZSIVP030-18	Chordata	<i>Hara jerdoni</i>
79.	ZSIVP031-18	Chordata	<i>Channa gachua.</i>
80.	ZSIVP032-18	Actinopterygii	<i>Clupisoma longianalis</i>
81.	ZSIVP033-18	Chordata	<i>Labeo boggut.</i>
82.	ZSIVP034-18	Actinopterygii	<i>Labeo boggut</i>

S.No.	NCBI Accession Number/BOLD ID	Animal Group	Species
83.	ZSIVP035-18	Actinopterygii	<i>Glossogobius giuris</i>
84.	ZSIVP036-18	Actinopterygii	<i>Bagarius bagarius.</i>
85.	ZSIVP037-18	Reptilia	<i>Ptyas mucosa.</i>
86.	ZSIVP038-18	Chordata	<i>Pangshura tentoria</i>
87.	ZSIVP039-18	Actinopterygii	<i>Cyprinus carpio.</i>
88.	ZSIVP042-18	Actinopterygii	<i>Macrobrachium lamarrei</i>
89.	ZSIVP043-18	Actinopterygii	<i>Macrobrachium lamarrei</i>
90.	ZSIVP044-18	Actinopterygii	<i>Osteobrama cotio.</i>
91.	ZSIVP045-18	Actinopterygii	<i>Osteobrama cotio</i>
92.	ZSIVP046-18	Actinopterygii	<i>Sperata seenghala</i>
93.	ZSIVP047-18	Actinopterygii	<i>Eutropiichthys vacha</i>
94.	ZSIVP048-18	Actinopterygii	<i>Ailia coila</i>
95.	ZSIVP049-18	Actinopterygii	<i>Glossogobius giuris</i>
96.	ZSIVP050-18	Actinopterygii	<i>Gagata cenia</i>
97.	ZSIVP051-18	Actinopterygii	<i>Siganus javus</i>
98.	ZSIVP052-18	Actinopterygii	<i>Botia almorhae</i>
99.	ZSIVP055-18	Actinopterygii	<i>Osteobrama cotio</i>
100.	ZSIVP058-18	Actinopterygii	<i>Johnius grypotus</i>
101.	ZSIVP059-18	Actinopterygii	<i>Cyprinus carpio</i>
102.	ZSIVP060-18	Actinopterygii	<i>Sperata seenghala</i>
103.	ZSIVP061-18	Actinopterygii	<i>Puntius sophore.</i>
104.	ZSIVP062-18	Actinopterygii	<i>Cirrhinus reba.</i>
105.	ZSIVP063-18	Actinopterygii	<i>Eutropiichthys vacha.</i>
106.	ZSIVP064-18	Actinopterygii	<i>Gudusia chapra.</i>
107.	ZSIVP071-18	Mammalia	<i>Muntiacus vaginalis.</i>
108.	ZSIVP076-18	Reptilia	<i>Varanus bengalensis.</i>
109.	ZSIVP077-18	Mammalia	<i>Manis pentadactyla</i>
110.	ZSIVP078-18	Mammalia	<i>Manis pentadactyla</i>
111.	ZSIVP079-18	Mammalia	<i>Macaca munzala</i>
112.	ZSIVP080-18	Mammalia	<i>Ailurus fulgens</i>
113.	ZSIVP081-18	Mammalia	<i>Ailurus fulgens</i>
114.	ZSIVP082-18	Mammalia	<i>Ailurus fulgens</i>
115.	ZSIVP083-18	Mammalia	<i>Ailurus fulgens</i>
116.	ZSIVP084-18	Mammalia	<i>Ailurus fulgens</i>
117.	ZSIVP085-18	Mammalia	<i>Prionailurus bengalensis.</i>
118.	ADP4308 .	Arthropoda	<i>Amblyomma javanenses</i>
119.	NMHS080-18	Amphibia	<i>Rhacophorus rhodopus.</i>
120.	NMHS082-18	Amphibia	<i>Rhacophorus maximus.</i>
121.	NMHS089-18	Amphibia	<i>Duttaphrynus himalayanus.</i>
122.	NMHS076-18	Amphibia	<i>Rhacophorus bipunctatus</i>
123.	NMHS066-18	Amphibia	<i>Nanorana conaensis</i>
124.	NMHS067-18	Amphibia	<i>Nanorana conaensis</i>
125.	NMHS068-18	Amphibia	<i>Nanorana conaensis</i>

S.No.	NCBI Accession Number/BOLD ID	Animal Group	Species
126.	NMHS069-18	Amphibia	<i>Nanorana conaensis</i>
127.	NMHS070-18	Amphibia	<i>Nanorana conaensis</i>
128.	NMHS071-18	Amphibia	<i>Nanorana conaensis</i>
129.	NMHS037-18	Reptilia	<i>Ptyctolaemus gularis</i>
130.	NMHS021-18	Reptilia	<i>Japalura variegata</i>
131.	NMHS007-	Reptilia	<i>Sphenomorphus indicus</i>
132.	NMHS010-18	Reptilia	<i>Asymblepharus sikimmensis</i>
133.	NMHS020-	Reptilia	<i>Japalura variegata</i>
134.	NMHS038-18	Reptilia	<i>Ptyctolaemus gularis</i>
135.	NMHS003-18	Reptilia	<i>Asymblepharus sikimmensis</i>
136.	NMHS040-	Reptilia	<i>Ptyctolaemus gularis</i>
137.	NMHS034-18	Reptilia	<i>Cryptodactylus khasiensis</i>
138.	NMHS058-18	Reptilia	<i>Asymblepharus himalayanus</i>
139.	NMHS023-18	Reptilia	<i>Japalura variegata</i>
140.	NMHS002-18	Reptilia	<i>Asymblepharus sikimmensis</i>
141.	NMHS008-	Reptilia	<i>Sphenomorphus maculatus</i>
142.	NMHS028-18	Reptilia	<i>Cryptodactylus khasiensis.</i>
143.	NMHS059-18	Reptilia	<i>Asymblepharus himalayanus.</i>
144.	NMHS024-	Reptilia	<i>Asymblepharus sikimmensis</i>
145.	NMHS019-	Reptilia	<i>Orthriophis cantoris</i>
146.	NMHS029-18	Reptilia	<i>Cryptodactylus khasiensis.</i>
147.	NMHS012-18	Reptilia	<i>Sphenomorphus maculatus</i>
148.	NMHS011-18	Reptilia	<i>Sphenomorphus maculatus</i>
149.	NMHS039-18	Reptilia	<i>Ptyctolaemus gularis</i>
150.	NMHS004-18	Reptilia	<i>Asymblepharus sikimmensis</i>
151.	NMHS060-18	Reptilia	<i>Asymblepharus himalayanus</i>
152.	NMHS041-18	Reptilia	<i>Cryptodactylus khasiensis</i>
153.	NMHS036-18	Reptilia	<i>Sphenomorphus maculatus</i>
154.	NMHS053-18	Reptilia	<i>Asymblepharus himalayanus</i>
155.	NMHS025-18	Reptilia	<i>Orthriophis cantoris</i>
156.	NMHS001-18	Reptilia	<i>Asymblepharus sikimmensis</i>
157.	NMHS057-18	Reptilia	<i>Asymblepharus himalayanu</i>
158.	NMHS018-18	Reptilia	<i>Orthriophis cantoris</i>
159.	NMHS015-18	Reptilia	<i>Sphenomorphus maculatus</i>
160.	NMHS016-18	Reptilia	<i>Japalura variegata</i>
161.	NMHS006-18	Reptilia	<i>Asymblepharus sikimmensis</i>
162.	NMHS017-18	Reptilia	<i>Japalura variegata</i>
163.	NMHS014-18	Reptilia	<i>Sphenomorphus maculatus</i>
164.	NMHS009-18	Reptilia	<i>Asymblepharus sikimmensis</i>
165.	ZSIWF024-18	Aves	<i>Ara macao</i>
166.	ZSIWF025-18	Aves	<i>Ara macao</i>
167.	ZSIWF027-18	Aves	<i>Platycercus eximius</i>
168.	ZSIWF001-18	Mammalia	<i>Paradoxurus paradoxurus</i>

S.No.	NCBI Accession Number/BOLD ID	Animal Group	Species
169.	ZSIWF002-18	Mammalia	<i>Manis pentadactyla</i>
170.	ZSIWF008-18	Mammalia	<i>Sus scrofa</i>
171.	ZSIWF004-18	Mammalia	<i>Bos taurus</i>
172.	ZSIWF005-18	Aves	<i>Coturnix coturnix</i>
173.	ZSIWF006-18	Mammalia	<i>Sus scrofa</i>
174.	ZSIWF007-18	Mammalia	<i>Manis pentadactyla</i>
175.	ZSIWF008-18	Mammalia	<i>Sus scrofa</i>
176.	ZSIWF009-18	Mammalia	<i>Rattus tanezumi</i>
177.	ZSIWF011-18	Mammalia	<i>Muntiacus muntjack</i>
178.	ZSIWF002-18	Mammalia	<i>Manis pentadactyla</i>
179.	ZSIWF014-18	Mammalia	<i>Panthera pardus</i>
180.	ZSIWF022-18	Aves	<i>Casuarus casuarus</i>
181.	MH423706	Amphibia	<i>Euphlyctis cyanophlyctis</i>
182.	MH423707	Amphibia	<i>Euphlyctis cyanophlyctis</i>
183.	MH423708	Amphibia	<i>Ingerana borealis</i>
184.	MH423709	Amphibia	<i>Ingerana borealis</i>
185.	MH423710	Amphibia	<i>Euphlyctis hexadactylus</i>
186.	MH423711	Amphibia	<i>Euphlyctis hexadactylus</i>
187.	MH423712	Amphibia	<i>Euphlyctis cyanophlyctis</i>
188.	MH423713	Mammalia	<i>Sus scrofa</i>
189.	MH423714	Mammalia	<i>Sus scrofa</i>
190.	MH423715	Mammalia	<i>Bos taurus</i>
191.	MH423716	Aves	<i>Coturnix coturnix</i>
192.	MH423717	Amphibia	<i>Xenophrys maosonensis</i>
193.	MH423718	Reptilia	<i>Ptyas mucosa</i>
194.	MH423719	Mammalia	<i>Canis aureus</i>
195.	MH423720	Amphibia	<i>Eutropis macularia</i>
196.	MH423721	Amphibia	<i>Hemidactylus brookii</i>
197.	MH423722	Amphibia	<i>Hemidactylus flaviviridis</i>
198.	MH423723	Amphibia	<i>Euphlyctis cyanophlyctis</i>
199.	MH423724	Amphibia	<i>Fejervarya caperata</i>
200.	MH423725	Reptilia	<i>Asymblepharus sikimmensis</i>
201.	MH423726	Reptilia	<i>Asymblepharus sikimmensis</i>
202.	MH423727	Reptilia	<i>Asymblepharus sikimmensis</i>
203.	MH423728	Reptilia	<i>Asymblepharus sikimmensis</i>
204.	MH423729	Reptilia	<i>Asymblepharus sikimmensis</i>
205.	MH423730	Reptilia	<i>Asymblepharus sikimmensis</i>
207.	MH423732	Reptilia	<i>Sphenomorphus maculatus</i>
208.	MH423733	Reptilia	<i>Sphenomorphus maculatus</i>
209.	MH423734	Mammalia	<i>Manis pentadactyla</i>
210.	MH423735	Mammalia	<i>Paradoxurus hermaphroditus</i>
211.	MH423736	Amphibia	<i>Euphlyctis cyanophlyctis</i>
212.	MH423737	Amphibia	<i>Euphlyctis hexadactylus</i>

S.No.	NCBI Accession Number/BOLD ID	Animal Group	Species
213.	MH423738	Amphibia	<i>Euphlyctis hexadactylus</i>
214.	MH423739	Mammalia	<i>Macaca silenus</i>
215.	MH423740	Amphibia	<i>Philautus longchuanensis</i>
216.	MH423741	Aves	<i>Sarcogyps calvus</i>
217.	MH423742	Aves	<i>Sarcogyps calvus</i>
218.	MH423743	Mammalia	<i>Bos taurus</i>
219.	MH423744	Mammalia	<i>Sus scrofa</i>
220.	MH423745	Reptilia	<i>Ptyas mucosa</i>
221.	MH423746	Amphibia	<i>Xenophrys maosonensis</i>
222.	MH423747	Mammalia	<i>Sus scrofa</i>
223.	MH423748	Mammalia	<i>Bos taurus</i>
224.	MH423749	Aves	<i>Coturnix coturnix</i>
225.	MH423750	Mammalia	<i>Macaca silenus</i>
226.	MH423751	Mammalia	<i>Macaca silenus</i>
227.	MH423752	Mammalia	<i>Macaca silenus</i>
228.	MH423753	Aves	<i>Sarcogyps calvus</i>
229.	MH423754	Aves	<i>Sarcogyps calvus</i>
230.	MH423755	Amphibia	<i>Euphlyctis cyanophlyctis</i>
231.	MH423756	Amphibia	<i>Fejervarya caperata</i>
232.	MH423757	Amphibia	<i>Fejervarya caperata</i>
233.	MH423758	Mammalia	<i>Canis aureus</i>
234.	MH423759	Reptilia	<i>Ophisops jerdonii</i>
235.	MH423760	Amphibia	<i>Hemidactylus flaviviridis</i>
236.	MH423761	Amphibia	<i>Asymblepharus sikimmensis</i>
237.	MH423762	Amphibia	<i>Asymblepharus sikimmensis</i>
238.	MH423763	Amphibia	<i>Asymblepharus sikimmensis</i>
239.	MH423764	Amphibia	<i>Asymblepharus sikimmensis</i>
240.	MH423765	Amphibia	<i>Asymblepharus sikimmensis</i>
241.	MH423766	Amphibia	<i>Euphlyctis cyanophlyctis</i>
242.	MH423767	Amphibia	<i>Euphlyctis cyanophlyctis</i>
243.	MH423768	Amphibia	<i>Euphlyctis cyanophlyctis</i>
244.	MH423769	Amphibia	<i>Fejervarya pierrei</i>
245.	MH423770	Amphibia	<i>Fejervarya pierrei</i>
246.	MH423771	Amphibia	<i>Fejervarya pierrei</i>
247.	MH423772	Aves	<i>Pericrocotus speciosus</i>
248.	MH423773	Reptilia	<i>Bungarus niger</i>
249.	MH423774	Reptilia	<i>Protobothrops jerdonii</i>
250.	MH423775	Amphibia	<i>Euphlyctis cyanophlyctis</i>
251.	MH423776	Mammalia	<i>Manis pentadactyla</i>
252.	MH423777	Mammalia	<i>Paradoxurus hermaphroditus</i>
253.	MH423778	Mammalia	<i>Sus scrofa</i>
254.	MH423779	Mammalia	<i>Sus scrofa</i>

90

**CAPACITY
BUILDING**

ANNUAL REPORT 2018-19

ZSI is regularly organising Training programmes, Symposia, Seminars etc. on different topics for researchers, students, forest personnels, Faculties of in house as well as other institutes.

TRAINING MODULES

Under the capacity building programme, ZSI is organizing a series of training programmes, workshops, symposia, seminars etc. on different thematic areas for the benefit of students, researchers, academicians, policy makers etc. Besides, ZSI is actively celebrating Earth Day, Biodiversity Day, World Environment Day and Wildlife Week. This year seven training workshops, one International Conference, two seminars and one workshop was organized by ZSI, in collaboration with other institutes and departments. Besides Environment day and Biodiversity Day were celebrated to create awareness.

01

Training workshop on "GIS and Remote sensing and its application in zoological research"

Coordinators: Dr. Shelley Acharya,
Dr. Lalit Kumar Sharma

Date: 9th to 10th August, 2018

16 scientists from ZSI Headquarter and Regional Centres joined the course. Sri Debal Roy, Chief Project Director, Bengal Forest & Biodiversity Conservation Project was invited as the Chief Guest. Dr. Debashis Chakrabarti, Scientist-SF, RRSC-East, ISRO joined as the resource person.



Orientation workshop on "Collection, preservation and identification of zoological specimens"

02

Coordinators: Dr. Shelley Acharya,
Dr. Dhriti Banerjee

Date: 8th to 11th October, 2018

52 Field Assistants, Field Attendants, Field Collectors from ZSI Headquarters participated in the programme. Sri Rajeev Sharma, CCF, West Bengal graced the occasion as Chief Guest. Dr. R.P Saini, Managing Director, West Bengal Forest Development Corporation was present as the special guest.

Workshop on "Wildlife Forensics and Crime Control"

03



Coordinators: Dr. Shelley Acharya,
Dr. Mukesh Thakur

Date: 21st to 22nd January, 2019

29 participants from Forest department, Enforcement departments, ZSI Hq and Regional Centres participated in the workshop. Shri Vinod Kumar Yadav, Member Secretary, West Bengal Zoo Authority was present as the Chief Guest. Shri Agni Mitra, Dy Director, WCCB, Eastern Region, Kolkata, West Bengal, Dr. Niraj Rai, Scientist C, Birbal Sahni Institute of Palaeosciences, Lughnow, Samir Majumder, Wildlife Advocate and Legal Adviser, Department of Forest, Government of West Bengal also graced the occasion. Shri Debal Roy, Chief Project Director, West Bengal forest & Biodiversity Conservation Project was present as Chief guest in valedictory session.

04

Hands-on-training on the "Collection, Preservation and Identification of Soil Fauna"

Coordinators: Dr. Anjum N.Rizvi,
Dr. Shelley Acharya

Date: 28th to 29th March, 2019

The training was attended by 30 participants from 9 Universities, 10 Colleges from 10 different States of India. Prof I.C Mittal, Kurukshetra University was present as Chief Guest. Prof. Wasim Ahmed, Aligarh Muslim University and Dr. JM Julka, Shooloni University also graced the occasion.

The hands-on training cum lectures were imparted by the scientists from ZSI and invited experts on dung beetles, soil nematodes, earthworms, testate amoeba, ciliophora, gymnamoeba, acari, spiders, ants, termites, wingless insects, ear wigs, millipedes and burrowing mammals. As a part of training programme the participants were exposed to field visit at Botanical Garden, Howrah where the field techniques on the collection and preservation of soil fauna was imparted. A manual on the "Collection, Preservation and Identification of Soil Fauna" authored by Kailash Chandra et al. was also released on the occasion.



05

National Workshop was organized on 26th April 2018 at Dehradun under the National Mission on Himalayan Studies

Coordinator: Dr. Lalit Kumar Sharma

A total of 93 participants representing MoEFCC, BSI, WII, FRI, GBPHIED, NGOs, State Forest Department of Indian Himalayan Region (Himachal Pradesh, Uttarakhand, Mizoram), local administration, colleges, NGOs and other participated

06

Two days training programmes were organized under NMHS LG project for stakeholders with respect to capacity building on monitoring of threatened vertebrates of the Indian Himalayan Reigon.

Coordinators: Dr. Lalit Kumar Sharma,
Dr. Mukesh Thakur

- Kaza, Lahaul & Spiti, Himachal Pradesh, 80 participants, Date: 20th to 21st Sept 2018.
- Uttarkashi, Uttarakhand, 98 participants, Date: 14th to 15th Dec 2018.
- Darjeeling, West Bengal, 120 participants, Date: 13th to 14th Feb 2019.

07

Taxonomy capacity building workshop on aquatic insects and Odonata

Coordinator: Dr. K. A. Subramanian,
SRC, Chennai

25 students and researchers of National Mission on Himalayan Studies, Sikkim University, Sikkim participated from 15th-18th September, 2018.

COLLABORATIVE CONFERENCES/ WORKSHOPS/ SEMINARS

01

Third International Conference on Status and Protection of Coral Reef, 2018 (STAPCOR-2018)

Held from 22-24 October, 2018 in Bangaram Island, UT of Lakshadweep, under the project 'Conservation and Management of coral reefs In Lakshadweep Islands - Long-term monitoring programme'. A total of 78 participants, (including 26 dignitaries - 8 overseas scientists from the United State of America, United Kingdom, Kuwait, Italy, France, Maldives, and Sri Lanka.), 42 delegates and 10 participants from Lakshadweep administration participated in this Mega event, on an island far away from Mainland.



National Seminar on Environmental changes and its impact on Faunal Diversity in Indian Agro-Ecosystems

02

ZSI organized it in collaboration with Punjab Agriculture University, Ludhiana, Punjab from 17th to 19th November, 2018.

Coordinator from ZSI: Dr. P. C. Pathania

Number of Participants: 200

National Seminar on Status and Diversity of Pollinators in India

03

Organized by ZSI-ENVIS centre on 8th March, 2019.

Coordinator: Dr Rajmohana, K.

Number of Participants: 20

Tools and techniques used in ciliate biology

04

Workshop was organized by Zoological Survey of India in collaboration with Delhi University held at India Habitat Centre, Delhi on 6th April 2018, as part of the International Symposium on Ciliate Biology, 4th-6th April, 2018, India Habitat Centre, Delhi, India.

Coordinators from ZSI: Dr. Jasmine, P
Dr. Santosh Kumar

60 participants and 15 Researchers including some international delegates participated

Celebration of the "International Day for Biological Diversity on 22nd May 2019"

Activities: Inter college Student Seminar on the theme "Biodiversity Conservation"; In-house Quiz Competition

Number of participants: 17



Celebration of the "World Environment Day on 5th June 2019"

Activities: Sit & Draw competition, Cleanliness Drive in the Alipore Zoo, Kalighat Temple premises, East Calcutta Wetlands, New Alipore Railway Station by the ZSI Scientists, Staffs and Research Scholars; Pledge, seminar and brainstorming session by ZSI scientists, Awareness rally.

Number of participants of entire programme: 200

01

LIBRARY & PUBLICATION DIVISION

ANNUAL REPORT 2018-19

The Library of Zoological Survey of India is one of the largest libraries in Asia on the subject Zoology and its different branches of studies. The formation of the library, had been started with the valuable documents on Zoological researches from more than two centuries old Institutions viz., former Indian Museum (1814-1875) of the Asiatic Society of Bengal and the Zoological Section of the Indian Museum (1875 – 1916) in Calcutta. More Precisely, the library of Zoological Survey of India, initiated its journey on 1st July, 1916 with the transferred documents from these two age old, prestigious organisations. These valuable inclusions have raised the standard and role of the library of Z.S.I. more effectively and efficiently to the users. As, one of the significant characteristics of the library is 'It grows with time

LIBRARY DIVISION

During the year 2018-2019, the total growth can be estimated as- 55110 number of books, 13844 bound volumes of journals and about the same nos. of loose volumes of journals published from India and different countries and also from its parent organisation.

During 2018-2019, 244 number of journals have been added, accessioned and displayed and in addition an on-line journal procured. 1748 readers from other institutions visited and benefited out of the library during the year.

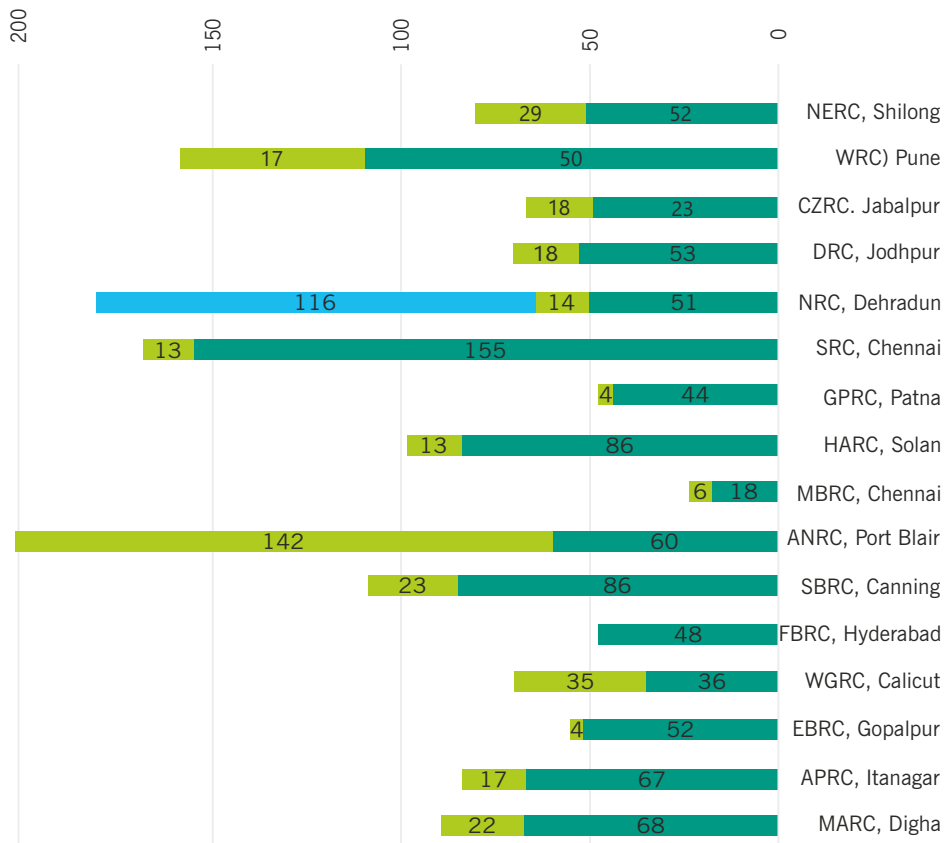


Fig. 1: Books and Journals added during 2018-19

- Other publications
- Journals added during the year
- Books added during the year

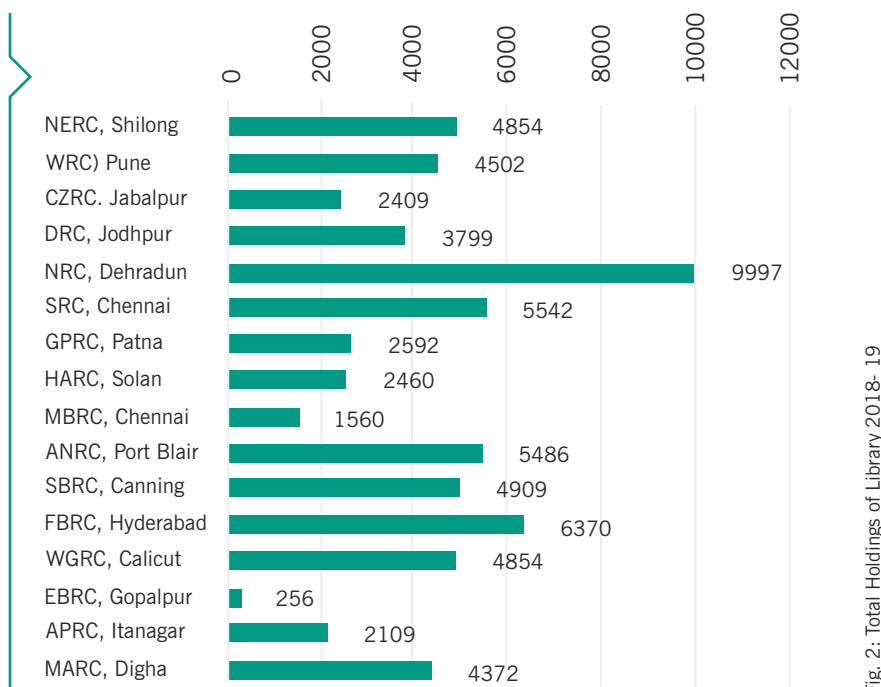


Fig. 2: Total Holdings of Library 2018- 19

PUBLICATION DIVISION

The Research contributions of scientists and researchers from ZSI and other institutes are being published regularly by the Publication Division of ZSI. Altogether 1645 documents of publications under 16 different series, including *Rec. zool. Surv. India - A Journal of Indian Zoology*, have been produced by ZSI. The publications of the Survey are widely circulated and have excellent reputation throughout the world.

Records of the Zoological Survey of India

(Formerly *Records of the Indian Museum*)

The Records of the Zoological Survey of India provides media opportunity for zoological communications dealing with taxonomy, faunistics, biology, ecology and population of any taxon, and acts as a journal of Indian Zoology. This is a quarterly publication with four parts annually. It was started in the year 1907 from the Zoological Section of Indian Museum as *Records of the Indian Museum* in order to publish result of faunistic surveys conducted by the scientists.

During the year 39 books and journals were published: Four volumes of *Records of Zoological Survey of India*, eight Occasional papers, three Conservation Area Series (Protected Area Network), one volume of Fauna of India, one Guide to Common Echinoids of A&N Islands, one book on Himalayan Ecosystem Series, 4, Faunal resources of Cold desert, Spiti Valley and Chandratat Lake; one volume of Status Survey Report No., 14, Status of Western Hoolock Gibbon, Fauna of India - Oribatid (Part-1); besides these a special publications namely, Current Status of Estuarine Faunal Diversity in India, Animal Discoveries - 2017, Chelonian Types of NZC, Faunal diversity of Biogeographical Zones : Islands of India, Annual Report 2016-17, Type Catalogue of Butterflies.

Apart from these 13 documents under CAMPA, Chhatisgarh Project were published during the period 2018-19.

Important Books released by the dignitaries:

- Animal discoveries 2017 by Hon'ble Prime Minister of India, Shri. Narendra Modi at New Delhi during World Environment Day - 2018.
- Faunal Diversity of Biogeographic Zones : Islands of India, by Hon'ble Minister, Ministry of Environment, Forest and Climate Change, Dr. Harsh Vardhan.
- Status of Coral Resources of India and Strategies for their Protection and Management, by Hon'ble Minister, Ministry of Environment, Forest and Climate Change, Dr. Harsh Vardhan.
- Chelonian Types of National Zoological Collections released by Hon'ble Minister, Ministry of Environment, Forest and Climate Change, Dr. Harsh Vardhan during his visit to FBRC, Hyderabad.
- Faunal Diversity of Estuarine Ecosystem released by Hon'ble Minister, Ministry of Environment, Forest and Climate Change, Dr. Harsh Vardhan during his visit to ZSI HQ.
- Faunal diversity of Indian Himalaya, by Secretary, Ministry of Environment, Forest and Climate Change, Shri C.K. Mishra.



MUSEUM AND TAXIDERM DIVISION

ANNUAL REPORT 2018-19

Museum and Taxidermy Division is supervising and maintaining the Insects, Fishes, Amphibia, Reptilia, Mammals and Ecological Gallery of Zoological Survey of India at Indian Museum.

The Section maintains the seven Zoological galleries in Indian Museum, Kolkata. For creating awareness on environmental and its faunal resources, this Section participates in various Science Exhibitions and Melas with Ecological, Environmental and Conservational themes.

SECTIONAL HOLDINGS

Gallery exhibits:

1733 (Mammal gallery; 351, Bird, Amphibia and Reptile gallery; 604, Fish gallery; 128, Ecology gallery; 153, Invertebrate; 497).

Type Specimen:

One Minke Whale (*Balaenoptera acutorostrata*) complete mounted skeleton, displayed in the Mammal gallery.

Four Zoological galleries Inaugurated by Honorable Minister, Ministry of Environment, Forest and Climate Change Dr. Harsha Vardhan and Honorable Governor of West Bengal Sri K. N. Tripathy along with Directors of ZSI and Indian Museum.



EXHIBITS OF ZOOLOGICAL GALLERIES OF INDIAN MUSEUM, KOLKATA

Invertebrate Gallery:

16 showcases with 497 models/ Exhibits (Protozoa, Porifera, Cnidaria, Platyhelminths & Nematoda, Annelida, Mollusca, Arthropoda, Echinodermata, Coral reefs, Insect inversion in Water, Interesting insects in Land, Wonders in deep hydrothermal vent, Arthropod & Molluscs, Minor Phyla).



Bird Gallery:

20 showcases [Hoatzin, Wetland, Migratory Birds, Mangrove, Scavenger Birds, Evergreen Forest, National & State Birds, Deciduous forest, Birds of China & South-east Asia, Alpine, Birds of South America, Birds of Desert (Africa), Birds of Australia & New Zealand, Island birds (Andaman & Nicobar Islands), Birds of North America, Europe & Africa, Birds of Antarctica] with 441 Birds (Indian Birds: 156 species, foreign birds: 60 species).

Fish Gallery:

17 showcases (Elasmobranch, Hill-stream Fish, Pond Ecosystem, Marine Reefcod, Marine Ecosystem, Shark & Ray, Indo-Pacific Marine Fish, Air breathing fish, Living Fossil fish) 68 species.

Amphibia and Reptiles:

Six showcases [Amphibians & Reptiles, Reptiles, Marine, Reptilia (Crocodilia), Aquatic Reptiles] with 41 reptiles and 20 Amphibians.

Mammal Gallery:

Total 314 exhibits under 143 species. Of which 63 are foreign species and 80 Indian species. Skeleton, 26 and skull 37.



Ecosystem Gallery:

11 ecosystems (Marine, Coniferous, High Altitude, Mangrove, Scrubland, Desert, Terai Grassland, Riparian, Wetland, Deciduous and Tropical rain Forest) with 153 exhibits.





2

IDENTIFICATION & ADVISORY SERVICES



ANNUAL REPORT 2018-19

The ZSI continued its task of rendering Identification and Advisory services to research and teaching institutions in India, Central and State Governments/Agencies, NGO's, Industries and also to individuals on zoological specimens and related matters.

S.N.	Faunal groups	No of Specimens Received and Identified	Number of Photographs Received and Identified	No of Species Identified	Received from (Organizations/ Institutions/ Departments)
1.	Arachnida:	1		1	Annamalai Exports, Chennai. Scorpions
2.	Araneae	74		9	Ramkrishna More A. C. S. College, Akurdi, Pune Singanallur, Coimbatore, Tamil Nadu
3.	Aves & Mammals	10		10	ICFRE, Institute of forest Biodiversity, Hyderabad.
4.	Bat	2		2	Principal Chief Conservator of Forest, Meghalaya
5.	Bird		1	1	Wildlife Crime Control Bureau (WCCB), Regional Office , Cochin.
6.	Corals & Sea Cucumbers	8			Department of Environment and Forests, Andaman and Nicobar Islands
7.	Crab	5		3	Kumaun University, Nanital
8.	Crab	53		1	Dalma WLS and Saranda Forest
9.	Crab	4		2	Dept of Zoology, Ranchi University
10.	Crab	1		1	Dept. of Zoology, Serampore College, Serampore, Hoogly
11.	Crab	1		1	Department of Environment and Forests, Andaman and Nicobar Islands
12.	Crab	5		3	Kumaun University, Nanital
13.	Decapoda	1		1	Marine Organism axonomy & Phylogeny, Institute of Oceanology, Chinese Academy of Sciences.
14.	Decapoda	45		8	JET's Z.B. Patil College, Dhule Department of Biodiversity, Wildlife Conservation & Management, V.P.M.'s B.N. Bhandarkar College of Science, 'Jhandweep' Chendani, Thane Lal Bahadur Shastri College of Arts, Science and Commerce, Satara Department of Zoology, Mary Matha Arts & Science College Department of Zoology, Holy Cross College, Tamil Nadu P.G. & Research Department of Zoology, Thiru Kolanjiappar Government Arts College, Tamil Nadu
15.	Decapods	4			Loyola College, Chennai
16.	Echinodermata	10		3	GoMMNP, Tuticorin. Tamilnadu
17.	Echinodermata	3		3	GoMMNP, Tuticorin. Tamilnadu
18.	Echinodermata	8			FRO, Keelakarai, Ramanathapuram, Tamilnadu
19.	Echinodermata	7			FRO, GoMMNP, Tuticorin. Tamilnadu
20.	Echinodermata (Holothuria)	1		1	Department of Environment and Forests, Andaman and Nicobar Islands
21.	Echinodermata (Holothuria) & Cnidaria (Gorgonian)	6			Department of Environment and Forests, Andaman and Nicobar Islands.
22.	Fish	4		4	New Arts, Commerce & Science College,

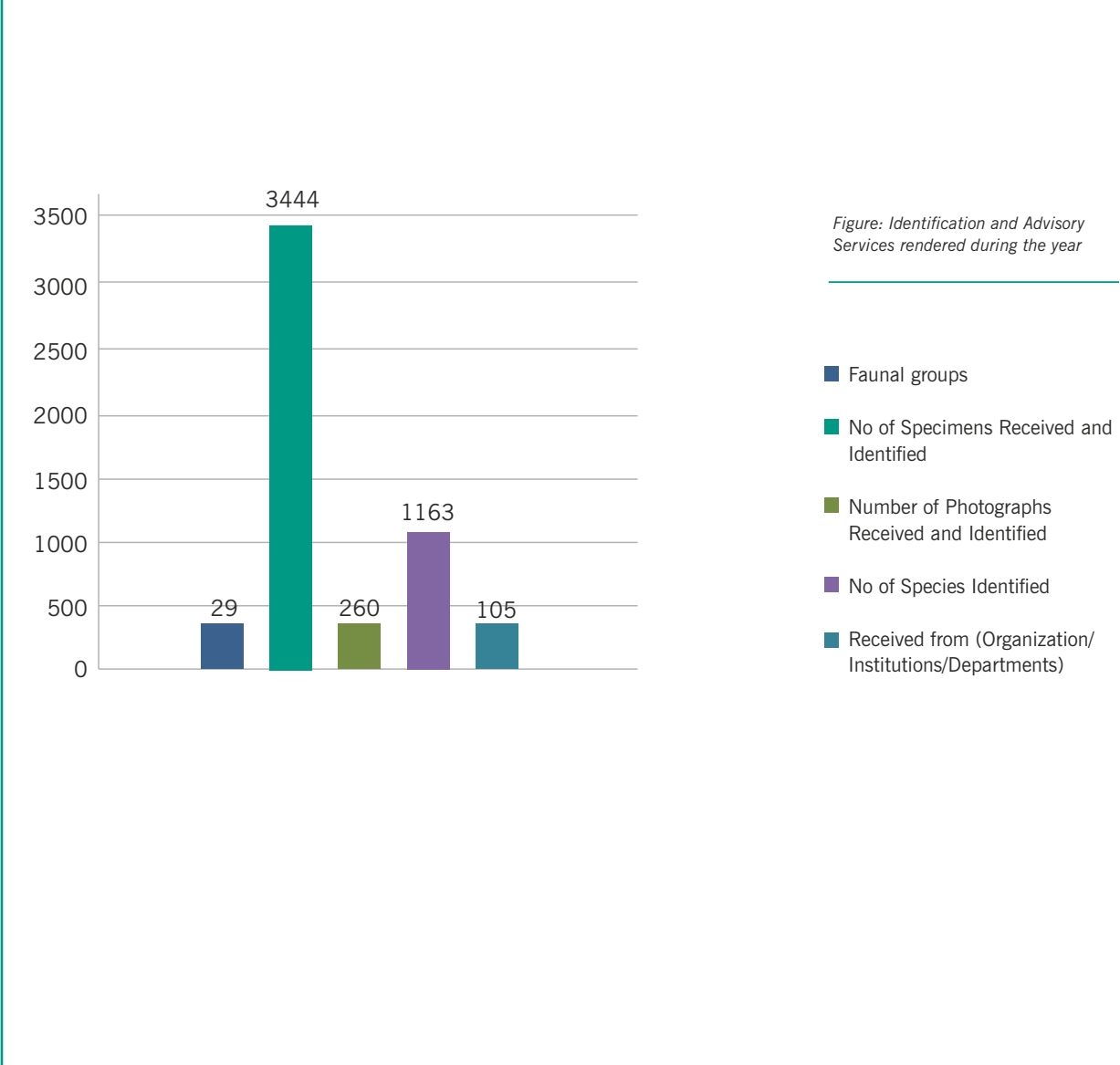
S.N.	Faunal groups	No of Specimens Received and Identified	Number of Photographs Received and Identified	No of Species Identified	Received from (Organization/ Institutions/ Departments)
23.	Fish	2		2	Loyola College, Chennai
24.	Fish (Giant Grouper)	1		1	Department of Environment and Forests, Andaman and Nicobar Islands
25.	Fossil	30		30	Dept of Anthropology, Bidhannagar College, Salt Lake, Kolkata
26.	Freshwater Molluscas	41		8	Department of Biotechnology, Bodoland University, Kokrajhar, Assam
27.	Gorgonian octocoral	6		6	NCSCM, Chennai.
28.	Insect (Lepidoptera, Coleoptera & Hymenoptera)	22		8	Defense Institute of High Altitude Research (DRDO) Ladakh, J.&K.
29.	Insecta	26		12	Jawaharlal Nehru Krish Vishwavidyalaya
30.	Insecta: Butterflies		20	14	Malabar Christian College, Calicut.
31.	Insecta: Butterflies		32	26	University of Calicut.
32.	Insecta: Butterflies		22	18	Department of Applied Zoology, Kannur University, Mananthavady Centre, Wayanad.
33.	Insecta: Butterflies		44	36	Department of Applied Zoology, Kannur University, Mananthavady Centre, Wayanad.
34.	Insecta: Butterflies		14	12	Department of Zoology, University of Calicut.
35.	Insecta: Butterflies		35	29	Department of Zoology, University of Calicut.
36.	Insecta: Butterflies		56	45	Department of Zoology, University of Calicut.
37.	Insecta: Collembola	20		2	Loyola College, Chennai
38.	Insecta: Diptera	6		3	Dept. of Zoology Vidyasagar College, Kolkata
39.	Insecta: Diptera	20		3	Dept. of Zoology D.S.B Campus Kumaun University, Nainital
40.	Insecta: Diptera	22		6	ICAR-CICR Nagpur
41.	Insecta: Diptera	5		4	Dept. of Genetics MDU, Rohtak, Haryana
42.	Insecta: Diptera	2		2	College of Horticulture & Forestry, Dr. Y.S.P University of Horticulture & Forestry, Neri, Hamirpur, Himachal Pradesh
43.	Insecta: Diptera: Calliphoridae	8		6	Morning Star Home Science College, Angamaly.
44.	Insecta: Formicidae	8		6	Victoria College, Kolkata
45.	Insecta: Formicidae	114		27	Tea Research Association, Tocklai Tea Research Institute, Jorhat, Assam
46.	Insecta: Formicidae	3		3	Bihar Agricultural University, Sabour, Bhagalpur-813210
47.	Insecta: Formicidae	17		6	Nirmala College, Coimbatore
48.	Insecta: Formicidae	7		7	Sammilani College, Kolkata
49.	Insecta: Formicidae	1		1	Scott Christian College, Nagercoil, Tamil Nadu
50.	Insecta: Formicidae	11		2	Achhruram Memorial College, Jhalda, Purulia, West Bengal
51.	Insecta: Formicidae	2		2	D.K.College, Mirza, and Guwahati
52.	Insecta: Hemiptera	37		28	JET's Z.B. Patil College, Dhule Dept. of Zoology, Ahmednagar College, Ahmednagar
53.	Insecta: Hymenoptera	02		1	JET's Z.B. Patil College, Dhule

S.N.	Faunal groups	No of Specimens Received and Identified	Number of Photographs Received and Identified	No of Species Identified	Received from (Organizations/ Institutions/ Departments)
54.	Insecta: Hymenoptera: Insecta: Pteromalidae	10		8	Aligarh Muslim University, Aligarh
55.	Insecta: Hymenoptera:	47		31	Ethiopian Institute of Agricultural Research, Insecta: Pteromalidae Ethiopia.
56.	Insecta: Hymenoptera:	21		44	Department of Zoology, University of Calicut. Pteromalidae
57.	Insecta: Hymenoptera:	7	7		Department of Zoology, Nagaland University, Vespidae Lumami.
58.	Insecta: Hymenoptera: Vespidae	4		4	ATREE, Bangalore.
59.	Insecta: Hymenoptera: Vespidae		11	10	Central University, Kasaragod.
60.	Insecta: Hymenoptera: Vespidae	1	1		Dept. of Zoology, Ramakrishna Mission Vivekananda Centenary College, Rahara, Kolkata-700118.
61.	Insecta: Hymenoptera: Vespidae & Scolidae	12		10	St. Joseph's College Devagiri, Kozhikode.
62.	Insecta: Hymenoptera: Vespidae & Sphecidae	9	7		Department of Zoology, Christ College, Irinjalakkuda.
63.	Insecta: Lepidoptera	17		14	Rani Durgawati Vishwavidyalaya, Jabalpur
64.	Insecta: Lepidoptera	8		8	Department of Entomology, College of Agriculture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur.
65.	Insecta: Lepidoptera	150		12	Department of Zoology, Kumaun University, Nainital
66.	Insecta: Lepidoptera	1		1	Dept. of Zoology Vidyasagar College Kolkata
67.	Insecta: Lepidoptera	33		24	Jharkhand Biodiversity Board
68.	Insecta: Lepidoptera	1		1	Dept. of Zoology, University of Calcutta.
69.	Insecta: Lepidoptera	1		1	Dept. Of Botany, Surendra Nath College, Kolkata.
70.	Insecta: Lepidoptera	45		29	Jharkhand Biodiversity Board
71.	Insecta: Lepidoptera	2		1	Department of Entomology, Bihar Agriculture College
72.	Insecta: Lepidoptera	3		1	Bihar Agriculture College, Purnia
73.	Insecta: Lepidoptera	1		1	Dept. Botany & Forestry, Vidyasagar University, West Bengal.
74.	Insecta: Lepidoptera	1		1	DRDO, Field Station, Pithoragarh, Uttarakhand.
75.	Insecta: Lepidoptera	4		3	Western Ghats survey, ZSI, Kolkata.
76.	Insecta: Lepidoptera	1		1	Dept. of Sericulture, Raiganj University.
77.	Insecta: Lepidoptera	3		3	Department of Forests & Environment, Meghalaya
78.	Insecta: Lepidoptera	3		2	Hojai College, Assam
79.	Insecta: Lepidoptera (Moths)	17			Rani Durgawati Vishwavidyalaya, Jabalpur
80.	Insecta: Lepidoptera	15			Department of Entomology, College of (Moths) Agriculture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur

S.N.	Faunal groups	No of Specimens Received and Identified	Number of Photographs Received and Identified	No of Species Identified	Received from (Organizations/ Institutions/ Departments)
81.	Insecta: Mantodea	7		5	Zamorins' Guruvayoorappan College, Calicut.
82.	Insecta: Odonata	20		5	Dept. of Sericulture, Raiganj University.
83.	Insecta: Odonata	5		5	Kumaun University, Nainital
84.	Insecta: Odonata	62		41	Calicut University, Calicut.
85.	Insecta: Odonata		8	8	Morning Star Home Science College, Angamaly.
86.	Insecta: Odonata	46		28	Kannur University, Wayanad.
87.	Insecta: Odonata	8		6	Providence Women's College, Kozhikode.
88.	Malabar Civet				Forest Veterinary & Forensic Surgeon.
89.	Mammalia	01		1	College of Horticulture, Kerala Agricultural University, Thrissur
90.	Mollusca	190		35	Bharathiar University, Coimbatore, Tamil Nadu.
91.	Mollusca	21		6	Berhampur University, West Bengal
92.	Mollusca	10		6	Marine Science Department of Berhampur University
93.	Mollusca	4		4	Remuna Degree College, Balasore.
94.	Mollusca	427		13	Government Degree College, Kalaburgi, Karnataka.
95.	Mollusca	40		31	Dr. Ajit Kr.Mohauty, Scientific Officer, I.G.C.A.R Kalpakkam, Tamil Nadu.
96.	Mollusca	5		1	Department of Zoology, Mahishadal Raj College, Mahishadal, Purbo Medinipur, West Bengal.
97.	Mollusca	142		17	SKUAST- Kashmir
98.	Mollusca	162		14	Berhampur University, Odisha
99.	Mollusca	40		17	Central institute of Fisheries Education, Panch Marg off Yari Road Mumbai-400061.
100.	Mollusca	11		5	Department of Zoology, Serampore Collge, Serampore, Hoogly 712201
101.	Mollusca	198		53	GEER Foundation,Gandhinagar Gujarat
102.	Mollusca	503		23	Department of Zoology, University of University, Pune, Maharashtra. K. J. Somaiya College of Arts, Commerce and Science, Kopargaon Dept. of Zoology, Ahmednagar College, Ahemadnagar Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati, Dist. Pune
103.	Mollusca	1		1	Saveetha Medical College and Hospital, Chennai
104.	Mollusca	1		1	Loyola College, Nungambakkam, Chennai - 600 034.
105.	Mollusca	1		1	Loyola College, Nungambakkam, Chennai - 600 034
106.	Mollusca	1		1	Loyola College, Nungambakkam, Chennai - 600 034
107.	Mollusca	4			National Institute of Siddha, Chennai.

S.N.	Faunal groups	No of Specimens Received and Identified	Number of Photographs Received and Identified	No of Species Identified	Received from (Organizations/ Institutions/ Departments)
108	Mollusca	2		2	National Institute of Siddha, Chennai.
109.	Molluscs	2			Department of Environment and Forests, A & N Islands
110.	Molluscs	25			Department of Environment and Forests, Andaman and Nicobar Islands
111.	Molluscs	12			Department of Environment and Forests, Andaman and Nicobar Islands
112.	Molluscs	2			Department of Environment and Forests, A & N Islands
113.	Opisthobranch	1		1	National Centre for Sustainable Coastal Management, Chennai
114.	Opisthobranch	1		1	Estuarine Biology Regional Centre, Orissa
115.	Opisthobranch	1		1	East Godavari River Estuarine Ecosystem, Kakinada, Andhra Pradesh
116.	Ostracod	6		6	CUSAT, Kochi
117.	Pisces	13		4	Dept. of Zoology, and University of Calcutta
118.	Pisces	26		14	Department of Fishery Science, St. Anthony's College, Shillong, Meghalaya
119.	Pisces	23		14	Department of Life Science and Bioinformatics, Assam University, Silchar, Assam
120.	Pisces	68		40	Department of Life Science, Assam University, Assam
121.	Pisces	5		5	St. Anthony's College, Shillong, Meghalaya
122.	Pisces	48		21	Dept. of Life Sciences, Assam University, Silchar, Assam
123.	Pisces	21		7	Himachal Pradesh University, Shimla.
124.	Polychaete	68		6	Berhampur University, Odisha
125.	Polychaete	68		6	Berhampur University, Odisha
126.	Porifera	Assorted			FRO, Headquarters Range (WL), Chennai
127.	Porifera	1		1	Bharathidasan University, Trichy, Tamilnadu
128.	prawns	1		1	Barathiar University, Coimbatore
129.	Prawns	1		1	Barathiar University, Coimbatore
130.	Prawns and crabs	4		2	Dept. of Zoology, Dhanamanjuri University, Imphal, Manipur
131.	Rotifer	1		1	Pondicherry University
132.	shrimp	1		1	Dept. of Zoology, Serampore College, Serampore, Hoogly
133.	shrimps	2		2	Dalma WLS and Saranda Forest
134.	Wild Boar and Spotted Deer	2		1	Department of Environment and Forests, Andaman and Nicobar Islands
135.	Wildlife	45		7	Crime Branch, Thane, Maharashtra. Crime Branch, Kalyan, Maharashtra. Forensic laboratory, Pune Local Crime Branch, Ahmednagar, Maharashtra. Police department, Thane city, Maharashtra.

S.N.	Faunal groups	No of Specimens Received and Identified	Number of Photographs Received and Identified	No of Species Identified	Received from (Organizations/ Institutions/ Departments)
					Mumbai Police Department, Maharashtra Office of the Range Forest Officer, Shukrawar Peth, Pune Customs department, Mundra, Kutch, Gujarat Maharashtra Forest Department Maharashtra State Biodiversity Board
136.	Wildlife material	3		3	Jaintia Hills Wildlife Division, Jowai, Meghalaya
137.	Zooplankton	6 wet collection		29	Department of Zoology, Govt. Degree College, Rajapur, Karnataka 138.Zooplankton9 wet collection23Department of Zoology, Bangalore University, Karnataka.
Total	29 groups	3444	260	1163	105



13

IDENTIFICATION OF CONFISCATED WILDLIFE MATERIALS



ANNUAL REPORT 2018-19

Scientists of ZSI are providing identification for confiscated material of different animals or parts of the body for the benefit of Court of law to culminate the wildlife crime.

Sl. No.	Material Type	Material Received from	Identified as
1.	Pangolin Scales	DFO, Baikanthapur Division, Siliguri	Chinese Pangolin (Sent to DNA Lab, ZSI)
2.	Horn	DFO, Gorumara Wildlife Division, Jalpaiguri	Identity could not be determined
3.	Pair of Horns	Agni Mitra, Dy. Director, WCCB (ER), Kolkata	Pair of Horns of Bos sp.
4.	Skull & body parts	DFO, Gorumara Wild Div, Jalpaiguri	Identity could not be determined
5.	Skin	DFO, Baikunthapur Div. Siliguri -	Identified as Skin of Leopard, <i>Panthera pardus</i> Linnaeus
6.	Hair	DFO, Gorumara Wildlife Division, Jalpaiguri	Identified as <i>Herpestes fuscus</i> , Indian Brown Mongoose
7.	Antlers	Siliguri Police Commissionerate, Siliguri	Identified as Antlers of Axis axis
8.	Brushes	J. R. Samarth ,DFO Madurai-02	Identified as hairs of <i>Herpestes edwardsi</i> , Indian Gray Mongoose.
9.	Brushes	J.R. Samarth ,DFO Madurai-02	Identified as hair of <i>Herpestes edwardsi</i> ,Indian Gray Mongoose.
10.	Skin	DFO, Gorumara Wildlife Division Jalpaiguri	Identified as skin of Leopard , <i>Panthera pardus</i>
11.	Shawls	Mazid Khan, Deputy Commissioner, Office of the Comm. Of Customs, New Delhi	Identified as the Shawls Containing the guard hairs of . Tibetan Antelope, <i>Pantholops hodgsonii</i>
12.	Tusk	Thomas Basumatary, Deputy Director, Director of Revenue Intelligence, Siliguri.	Identified as Tusk of <i>Elephas maximus</i> , Asiatic Elephant
13.	Canine Tooth	DFO,Baikunthapur Div. Ravindra Nagar Siliguri-734006	Identified as Canines of Tiger, <i>Panthera tigris</i>
14.	Piece of suspected Ivory	DFO, Old Court Campus Collect orate avenue, Jalpaiguri	Identity could not be determined.
15.	Skin	S. Sarkar, S.I., Tapan Police station, Dt. Dinajpur, W.B.	Identified as belonging to Golden Jackal, <i>Canis aureus</i> .
16.	Claws (3 numbers)	Judicial Magistrate, Court no 3, Dindigul, Tamil Nadu through O/C, SRC,ZSI, Chennai.	Two claws identified as belonging to Tiger, <i>Panthera tigris</i> and the third sent for DNA analysis.
17.	Hair brushes	DFO, Gorumara wildlife Division, Jalpaiguri.	Identified as belonging to hair of Indian Grey Mongoose <i>Herpestes edwardsii</i>
18.	Skin	Forest Range Officer, Wildlife Crime control cell & data management unit, Kolkata.	Identified as skin of Leopard, <i>Panthera pardus</i> .
19.	Horn and task	DFO, Baikanthapur Division, Siliguri	Identified as fake Rhino Horn and part of task belonging to Asiatic Elephant, <i>Elephas maximus</i> .
20.	Scales	S.I. Bipul Kumar Sarkar NJP, GRPS, Siliguri GRP, Jalpaiguri	Sent to DNA LAB

Sl. No.	Material Type	Material Received from	Identified as
21.	Shawl	Dy. Comm. of Customs, Air Cargo export Commissionerate, New Delhi.	Does not contain hairs of Tibetan antelope.
22.	4 Nos. tasks	Dy. Field Director, Buxa tiger Reserve, Alipur duar, West Bengal	Identified as task belonging to Asiatic Elephant, <i>Elephas maximus</i> .
23.	Pictures of seized animals	Shri Spencer, IRS, Deputy Director, Directorate of Revenue Intelligence, Kolkata.	1. Black and white ruffed Lemur, <i>Varecia variegata</i> . 2. Pygmy marmoset, <i>Cebucella pygmaea</i> . 3. Albino domestic cat
24.	Meat sample	Range Officer, Berhampur south range, Murshidabad.	Under process



ZSI Material



Seized Material



INTERNATIONAL PARTICIPATION

The background of the entire page is a photograph of a person, likely a scientist, standing in a field of tall grass or reeds. The image is heavily overlaid with a semi-transparent green filter. The person is positioned in the lower right quadrant, looking towards the left. The overall mood is serene and academic.

ANNUAL REPORT 2018-19

Scientists of ZSI have been participating
in important International meetings,
Symposiums and Expeditions

SI No:	Name of Scientists	Centre Name	Programme Name, dated & venue
1	Dr. Jasmine P. Scientist-D	ZSI, Kolkata	Participated in the Arctic Expedition Conducted by NCAOR, for the programme of ZSI "Longterm Monitoring Programme on vertical migration of Plankton and their role in the Biogeochemistry of Kongsfiorden, Arctic" from 25.06.2018 to 06.08.2018
2	Shri K. C. Gopi, Scientist-F	ZSI, Kolkata	Participated in the 30th meeting of the Animals Committee (AC30) of the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) from 16th to 20th July, 2018 at the Centre International de Conference (CICG) in Geneva, Switzerland.
3	Dr. Anil Mohapatra, Scientist-D, Dr. K. K.Bineesh, Scientist-D Shri S. S. Mishra, ZSI, Scientist-C	EBRC, ZSI, Gopalpur ANRC, ZSI Port Blair Kolkata	Participated in the third leg of survey with the research vessel Dr. Fridtj of Nansen from 02.08.2018 to 17.08.2018 for Chittagong, Bangladesh,
4	Dr. Kailash Chandra, Scientist-G & Dr. Navneet Singh, Scientist-D	ZSI, Kolkata	Participated in the 5th Asian Lepidoptera Conservation Symposium (ALCS 5) held at University of Hong Kong, Hong Kong during 13th to 14th December 2018
5	Dr. Anil Mohapatra, Scientist-D,	EBRC, ZSI, Gopalpur	Attended the Sub-Regional Science-Policy Dialogue (SPD) for South and West Asia scheduled held at Kathmandu, Nepal by IPBES from 27-28 February, 2019.

Survey with the research vessel Dr. Fridtj of Nansen for Chittagong, Bangladesh





*5th Asian Lepidoptera
Conservation Symposium
(ALCS 5) held at University
of Hong Kong*

ES

**SEMINARS,
CONFERENCES,
WORKSHOPS &
MEETINGS**

ATTENDED BY SCIENTISTS

During the year, scientists of ZSI
have been actively involved in many
important scientific activities like
Conferences, Workshops, Symposia
and Meetings

ANNUAL
REPORT
2018-19

SEMINARS, CONFERENCES, WORKSHOPS & MEETINGS ATTENDED BY SCIENTISTS OF ZSI

Conferences (18)

1. Sandeep Kushwaha, attended ESW 3rd International Conference at Jammu and Kashmir from 29 to 31 July 2018.
2. Dr. P. C. Pathania and Dr. Narender Sharma attended the "International Conference on Science: Emerging Scenario & Future Challenges" held at NIT, Hamirpur from 7th to 10th September 2018.
3. Dr. V. D. Hegde attended "National Conference" to deliver key note address on "Recent Trends and Advances in Fresh Water Biodiversity" held at Nanded Education Society's Science College, Nanded from 24th to 26th September 2018.
4. Dr. Bindu L. attended the conference of the "International Biodiversity Congress" held at Dehradun from 3rd to 7th October 2018.
5. Dr. Kailash Chandra, Director, Dr C. Raghunathan, Dr Rajkumar Rajan, Dr Anil Mohapatra, and Dr Basudev Tripathy attended the "International Conference on Status and Protection of Coral Reefs" jointly organized by Administration of the Union Territory of Lakshadweep and Zoological Survey of India, at Bangaram Island at Lakshadweep/ Kavaratti from 20th to 25th October 2019.
6. Dr. Kailash Chandra, Director attended as Chief Guest the 11th National Conference of Medical Arthropodology on "Vector-Borne and Zoonotic Diseases: Surveillance & Control under dynamics of global warming, climate change and environment" organised by the Department of Zoology, D.A.V. (PG) College, Dehra Dun on 26th to 27th October 2018.
7. Dr Kailash Chandra, Director, attended one day seminar on "Integrated Coastal Zone Management-Experience and Way Forward", organized by the State Project Management Unit-ICZMP, West Bengal on 31st October 2018, held at Biswa Bangla Convention Center, New Town, Kolkata.
8. Mr. Imran Alam, attended one International Conference (ICECS, 2018) at Central University of Jharkhand, Ranchi, from 31st October to 02nd November 2018, where he presented a poster on "Nest Composition of House Crow *Corvus splendens* in an Urban Ecosystem of Kolkata".
9. Dr.S.Sambath attended ISWS Golden Jubilee International Conference on Weed and Society: Challenges & Opportunities organized by Directorate of Weed Research ICAR-DWR, Jabalpur (M.P.) from 21st to 24th November 2018.
10. Dr. B. Sinha attended the 18th Annual Conference of the Heads of Science Centres/Museums, India as an invitee at D K State Convention Centre, Itanagar organized by A P State Council of Science & Technology on 8th December 2018.
11. Dr G.P., Mandal, presented a paper in Golden Jubilee International Conference on "Trends in Zoology" from 3rd to 4th January 2019 at Burdwan University, Burdwan, West Bengal.
12. Dr.S.Sambath attended ESW (Environment and Social Welfare Society) 6th Annual National Research Conference on "Heritage Conservation and Natural Resource Management" on 30th to 31st January 2019, at Khajurao, Madhya Pradesh.
13. Dr Kailash Chandra, Director attended a three day International Conference on "Changing Contours of Blue Economy - Promises and Challenges (ICBE- 2019)" as Chief Guest at

Faculty of Marine Sciences, Annamalai University, Parangipettai, and Tamil Nadu from 5th and 6th February 2019.

14. Dr. Basudev Tripathy delivered lecture during the National Conference on Advances on Zoological Research, organized by Berhampur University, Berhampur, Odisha on 14th February 2019.
15. Dr. Kailash Chandra, Director attended and delivered a keynote address in "National Conference on Frontiers in Environment, Health and Biosciences" as Chief Guest organised by Institute of Biosciences & biotechnology, CSJM University, Kanpur, Uttar Pradesh from 15th to 17th February 2019.
16. Dr Pratyush P. Mohapatra, was invited as Guest of Honour from Nachiketa College, Vijay Nagar, Jabalpur on 28th February 2019 and presented an invited talk on "Taxonomy and Conservation: With special reference to Faunal Diversity in Central India".
17. Dr. Basudev Tripathy, delivered lecture during the National Conference on Advances on Zoological Research, organized by Utkal University, Bhubaneswar, Odisha on 3rd March 2019.
18. Dr. C. Raghunathan attended the International Conference on Benthos (ICB-19) at Cochin University of Science and Technology, Kochi on 6th March 2019.

Workshops (33)

1. Dr. Jasmine.P, and Dr Santosh Kumar, participated as the resource person in the Workshop on 'Tools and techniques used in ciliate biology' held at the India Habitat Centre, Delhi on 6th April 2018.
2. Dr L. Kosygin Singh, attended the National Workshop on National Inland Fisheries and Aquaculture Policy of India (NIFAP) 2018 at ICAR-CIFE, Mumbai from 26th to 27th April 2018.
3. Dr. Basudev Tripathy co-organised the launching Workshop of the NMHS funded Himalayana Biodiversity, held at Dehradun on 24th May 2018.
4. Shri Shibananda Rath and Shri Sreejith S. Kumar participated in the workshop on "Modern Techniques for Molecular and Morphological Characterization of Crustaceans, (IWOMTC-2018)" held at Faculty of Marine Sciences, Centre of Advanced Study in Marine Biology, Annamalai University, Parangipettai, Tamil Nadu from 22nd June to 8th July 2018.
5. Dr L. Kosygin Singh, attended the Eastern Region Workshop on "Conservation and Management of Wetlands" organized by the Ministry of Environment, Forest & Climate Change, New Delhi and hosted by the Botanical Survey of India, Kolkata and delivered a lecturer as Resource Person on "Monitoring and Managing Wetlands as Biodiversity Habitat" on 6th July 2018.
6. Dr. Kailash Chandra, Director, attended one day workshop on Elephant-Human Conflict & Evaluation of Biodiversity Research Studies in S-W Bengal at Conference Hall, Bon-Bhawan, AE-390, Salt Lake on 25th July 2018.
7. Dr. C. Venkataraman and Dr. Mukesh Thakur attended and presented talk on "Distribution and Population Estimation and Ecological Reconnaissance of the Small Mammals of South Bengal" in the workshop on "Man-Animal Conflict & Evaluation of Biodiversity Research Studies" held at Conference Hall, Bon-Bhawan, AE-391, Salt lake, Kolkata on 25th July 2018..

8. Dr. K. K. Bineesh, Dr. J.S. Yogesh Kumar and Dr. Mrinal Kumar attended an "International Workshop on Gobioid Fishes" held at Vivekananda College, Kanyakumari from 8th to 13th August 2018.
9. Dr. P.C. Pathania, Dr. Karuthapandi M, Dr. Chitra J , Mrs Anindita Ghosh, Mr.Imran Alam, and Mrs Debashree attended workshop on "GIS and remote Sensing and its application in Zoological research" from 9th to 10th August 2018 held at ZSI, HQ, Kolkata.
10. Dr Devanshu Gupta participated as a resource person in the training programme on "GIS and Remote Sensing and its application in Zoological Research" held at Zoological Survey of India, New Alipore, Kolkata from 9th to 10th August 2018. He also delivered a lecture on "Species Distributional Modelling".
11. Dr. Kailash Chandra, Director and Dr. Rajkumar Rajan, attended National Workshop on "Rapid Response Plan for Managing Coral Reef Ecosystems of India" being organised under GEF-UNDP-GOI NATCOM project at Tuticorin, Tamil Nadu and also chaired a 2nd Technical Session during the workshop on 23rd August 2018.
12. Dr. Basudev Tripathy attended National Workshop on "Conservation Status and Resilience of Indian Wildlife" held at Department of Environmental Science, Andhra University on 31st August 2018..
13. Dr. Rajkumar Rajan attended "National Consultation workshop for recommending the future status of Sea Cucumber conservation in India" held at Wildlife Institute of India, Dehradun on 3rd September 2018.
14. Dr. K. K. Bineesh, participated in the two days National workshop on Intellectual property rights from 26th to 27th September 2018 at Dr. B. R. Ambedkar Institute of Technology, Pahargao, Port Blair.
15. Shri Gopinath Kundu, and Shri Biswajit Roy, attended the orientation workshop on Collection, preservation and Identification of Zoological Specimens held at HQ, ZSI from 8-11th October 2018.
16. Dr. Basudev Tripathy attended one day workshop on "Climate Change Adaptation Action into Sea Turtle Conservation in Odisha" held at the DRTC, CYSD, E-1, Institutional Area, Gangadhar Meher Marg, Bhubaneswar, Odisha, on 10th October 2018.
17. Dr. G. Sivaleela, participated in the workshop on "Biodiversity and Bioresources" conducted by DKM College, Vellore and delivered talk on "Marine Sponges and Nematodes" on 10 October 2018.
18. Dr. G. Maheswaran, participated in 2nd Himalayan Scientist Consortium organized by National Mission on Himalayan Studies (NMHS) of G. B. Pant National Institute of Himalayan Environment and Sustainable Development, Almora to assess progress of research works funded by NMHS from 26th to 27th November 2018.
19. Dr. Kailash Chandra, Director, attended the "Dissemination Workshop on the Outcome of CEBPOL" on 5th December 2018, organized by MOEFCC, New Delhi and National Biodiversity Authority, Chennai in technical collaboration with Norwegian Environment Agency (NEA), Ministry of Norway, Norway at "The Theatre" Habitat World, India Habitat Centre, Lodhi Road, New Delhi-110003.
20. Dr. Navneet Singh attended workshop cum monitoring meeting of NMHS at Almora on 7th January 2019 and presented the progress of project on Assessment of moths as significant pollinators.
21. Dr C. Raghunathan, Dr Basudev Tripathy, Dr Pratyush Mohapatra and Dr. Navneet Singh attended "National Workshop on Recent Trend in Taxonomy" from 10th to 11th January 2019, held at Jodhpur, Rajasthan.
22. Dr. M. Kamalakannan, Mrs. Rehnuma Sulthana and Mr Imran Alam attended a two day workshop on Wildlife Forensics and Crime control at HQ, Kolkata on 21st-22nd January 2019.
23. Dr. B. Sinha was invited as a panelist and participated in the Workshop cum Brainstorming on Himalaya matters for Ecological and Economic Security focusing on North Eastern States of Indian Himalaya, at

NIRDPR-NERC Campus, Guwahati on 22nd January 2019.

24. Dr. Boni Amin Laskar, attended APSBDB-Cross Sectoral Workshop and Action Plan on 30.01.2019 at Vijayawada.
25. Dr. Gopal Sharma attended a workshop on Validation and Consultation Workshop for Clean Air Action Plan on January 29th 2019 in ADRI.
26. Dr Devanshu Gupta participated as a resource person in the "National Workshop on Taxonomy of Thysanoptera (Insecta)" under AICOPTAX Programme, from 8th to 9th February 2019 at ZSI, HQs., Kolkata. He also delivered a talk on "Insect Diversity of India: Collection Preservation and Identification".
27. Dr. G. Maheswaran attended a Mapping workshop on Critically Endangered White-bellied Heron at Guhwati from 15th to 18th February, 2019.
28. Dr.S.Sambath, attended one day administrative workshop on "NPS Operation" organised by the MoEF&CC at Ganga auditorium, Indira Paryavaran Bhawan, Jor Bhagh, New Delhi on 25th February 2019.
29. Dr. Gopal Sharma attended a workshop of post dolphin survey "Dolphin Status in River Ganga Gandak and Ghaghra on 28th February 2019 at AranyaBhawan, Bihar.
30. Dr. Bineesh, K.K., attended two days workshop on Whale Shark conference at Gujarat organised by WTI, New Delhi from 14th & 15th March 2019.
31. Dr. C. Sivaperuman delivered a lecture on Faunal diversity of A & N Islands in the one day workshop on Forests & Education as a part of World Forestry Day 2019 celebration on 15th March 2019.
32. Dr. Navneet Singh, delivered one lection in capacity Building Workshop on Long term monitoring of Himalayan Biodiversity held from 31st March- 1st April 2019 at Itanagar.
33. Dr. B. Sinha made a presentation entitled "Necessity of baseline data/reference point in Long Term Monitoring of Biodiversity - The Eastern Himalayan (Arunachal) Perspective in the 3rd Capacity Building Workshop on Long

Term Monitoring of Himalayan Biodiversity for stakeholders of Himalayan region organized by ZSI, Kolkata and Itanagar at Cygnet Inn Trends during 31st March to 1st April 2019.

SEMINARS / SYMPOSIA (14)

1. Dr. Tamal Mondal attended the National Seminar on Environmental Issues as a chairperson and lead speaker held at Vivekananda College Barisha, Kolkata, West Bengal from 5th to 8th April 2018.
2. Dr. Gaurav Sharma, delivered lecture in "International Day for Preservation of Ozone Layer" on 14th September, 2018 at MoEFCC, New Delhi.
3. Dr. Gaurav Sharma and Dr. S. S. Talmale attended the "10th South Asian Dragonfly India Meet & Symposium-2018" held at Hislop College, Nagpur from 2nd to 7th October 2018.
4. Dr. Kailash Chandra, Director, attended the inauguration of "India International Science Festival 2018 (IISF)", organised by Department of Biotechnology at IGP, Lucknow on 5th October 2018.
5. Dr. K. A. Subramanian, delivered a lecture on "Conservation of Dragonflies in the Third Pole" during 10th South Asian Symposium on Odonatology at Hislop College, Nagpur on 3rd October, 2018.
6. Dr. Jasmine P. attended Seminar on the "Geography and Ecology of the Poles of the Earth - based on the experiences of the expeditions to Arctic and Antarctica" held at the Department of Zoology, University College, Thiruvananthapuram on 15th October 2018.
7. Dr Kailash Chandra, Director, Dr L. Kosygin Singh, Dr Anjum Rizvi, Dr P.C.Pathania, Dr M.S.Pandher and Dr K. Tyagi, attended National Seminar on Environmental Changes and Its Impact on Faunal Diversity in Indian Agro-ecosystems organised by the Department of Zoology, Punjab Agricultural University, Ludhiana and Zoological Survey of India, Kolkata held at Ludhiana from 19th 20th November 2018.

8. Dr. Kailash Chandra, Director, attended 'Interdisciplinary Refresher Course in Environment Studies (All Disciplines)' as Guest of Honour, organised by Kurukshetra University, Kurukshetra in collaboration with UGC-Human Resource Development Centre, from 31st January to 03rd February 2019.
9. Dr. Anil Mohapatra attended International Seminar on "Environmental History and Sustainability: The Black-White Journey of Sustainable Development in Reality and Education" Organised by Bajkul Milani Mahavidyalaya, Kismet Bajkul, West Bengal from 05th to 07th February 2019 and presented talk on "Conservation of Marine fauna: An urgent need: High time to think beyond flagship species" in the technical session
10. Dr. Kailash Chandra, Director, attended and delivered a key note address in the "National Seminar on Taxonomy, Biodiversity & Conservation", as Guest of Honour, organized by PG and Research Department of Advanced Zoology and Biotechnology, Loyola Institute of Frontier Energy (LIFE), Loyola College, Chennai, Tamil Nadu on 11th February 2019.
11. Dr. S. Prabakaran, attended and presented a lecture on Insect Diversity in India during the National Seminar on Taxonomy, Biodiversity and Conservation held at Loyola College, Chennai during 11th & 12th February 2019.
12. Dr. C. Venkatraman and Dr L.K.Singh. attended one day seminar organized by West Bengal Biodiversity Board, on "Mainstreaming Biodiversity: convergence of stake holders for sustainability" at Kolkata on 13th February 2019.
13. Dr Navneet Singh, Dr. M. E. Hassan, Dr D. Gupta and Mr Imran Alam, participated in the National Seminar on "Status and Diversity of Pollinators in India" held on 8th March, 2019 at Zoological Survey of India, Kolkata.
14. Sandeep Kushwaha, attended National Symposium on Innovation in Agriculture, Environment and Technology for inclusive development held on 17th & 18th March, 2019 organised by SBSRD, Allahabad, U.P.

Trainings (4)

1. Dr. Gopal Sharma attended two days Training program as an expert of Dolphin Population assessments in Rivers of Bihar from 28th to 29th August 2018.
2. Mr. R. S. Mridha, attended a 5 days Training programme of Computer Training in Hindi at Nizam Placae Kolkata from 3rd to 7th September 2018.
3. Mrs Jayita Sengupta, Mr. Siddharth Singh, Miss Mousumi Chowdhury, Sourav Mondal, Rumpa Paul and Ms Nupur Sen attended the training programme on "Collection, preservation and identification of zoological specimens" held from 8th - 11th October 2018, at ZSI , Kolkata.
4. Dr Anjum N. Rizvi, Dr Rajmohana, Dr Sheela, Dr. Jasmine. P Dr Guruprada Mandal Dr Shelley Acharya, Dr Rinku Goswami, , Dr. Santosh Kumar , Dr D. Gupta and Dr Chitra served as resource persons for the "Hands-on Training on the Collection, Preservation and Identification of Soil Fauna" held from 28th to 29th March 2019 at ZSI HQ.18. Dr. Sanjeev Kumar attended a meeting under the research programme entitled "Studies on faunal Diversity of Narayan Sarovar WL Sanctuary, (NSWLS), Gujarat"

Meetings / Events (97)

1. Dr. C. Raghunathan served as Chairman for interview committee for the selection of JRF, JPA and Field Asst. under National Himalayan Mission Project on Vertebrates held at ZSI Headquarters on 2nd April 2018.
2. Dr Kailash Chandra, Director and Dr. C. Raghunathan attended the meeting with Hon'ble Minister, Mr. Harsh Vardhan, MoEFCC on 7th April to discuss about the activities of ZSI.
3. Dr. Kailash Chandra, Director, and all the Scientists of ZSI, HQ and all the Officer-in-Charge of 16 Regional Centres attended Annual Meeting of Senior Officers of Regional Centres of Zoological Survey of India to discuss the progress made during the period 1st April, 2017 to 31st March 2018 from 9th to 11th April, 2018 at ZSI, HQ, Kolkata. Dr. Manju Pandey, Joint

- Secretary, MoEFCC, New Delhi, graced the occasion as Chief Guest on the concluding day.
4. Dr Lalit Sharma, Dr. Mukesh Thakur and Dr Devanshu Gupta participated as a member in the Selection Committee for the interview for the project entitled "Conservation of Threatened Vertebrate and Capacity Building" held at Northern Dehradun from 6th to 11th April 2019.
 5. Dr. B. Sinha, attended the 8th meeting of the Arunachal Pradesh Biodiversity Board as a member in State Forest Research Institute, Itanagar on 13th April 2018.
 6. Dr. C. Sivaperuman visited Pondicherry University to serve as expert member in the inspection team held at Poducherry from 15th to 18th April 2018.
 7. Dr. C. Sivaperuman, attended a meeting with Shri. Tapan Mondal, IAS, Consultant, UNDP for the sustainable development of Island ecosystem on 17th April 2018.
 8. Dr Kailash Chandra, Director, Dr Basudev Tripathy, Dr Mukseh Thakur, Dr Lalit Sharma and Dr D. Gupta attended the Book Release Function and Launching of NMHS project on "Conservation of Threatened Vertebrate Fauna in Indian Himalayan Region through Long-term Monitoring and Capacity Building" on 26th April 2018. Hon'ble Secretary, MoEF&CC Shri C.K. Mishra, IAS released the books. On this occasion Faunal Diversity of Indian Himalaya book, was also released.
 9. Dr. B. Sinha attended the 2nd meeting of the 22nd State Board for Wildlife, Arunachal Pradesh, Chaired by Hon'ble CM on 26th April 2018.
 10. Dr. Kailash Chandra, Director, attended the launching programme of River Dolphin Conservation under Green Skill Development Programme at Zoological Survey of India, Gangetic Plains Regional Centre, Patna from 2nd May, 2018 to 3rd May, 2018.
 11. Dr. Kailash Chandra, Director, attended the Inaugural Function of Botanic Garden of Indian Republic Noida on 12th May 2018 at New Delhi
 12. Dr. Kailash Chandra, Director, attended the 15th Meeting of State Level Committee for Development, Implementation and Monitoring the Mangrove and Coral Reef on 14th May, 2018 at Gandhinagar, Gujarat, chaired by the PCCF & HOF, Gujarat.
 13. Dr. K. A. Subramanian represented ZSI in 47th EC meeting on ABS at NBA, Chennai on 14th and 15th May, 2018.
 14. Dr. Kailash Chandra, Director, attended the meeting to discuss on Man-Crocodile Conflict in Andaman & Nicobar Islands at MoEF&CC, Govt. of India, New Delhi on 15th May, 2018.
 15. Dr. C. Raghunathan attended the ICZM Project Phase-II meeting held on 16th May 2018.
 16. Dr. C. Raghunathan attended International Biodiversity day organized by NBA/ MoEFCC at Hyderabad on 22nd May 2018.
 17. Dr. C. Raghunathan, Dr. Deepa Jaiswal, Dr. Boni Laskar, Dr. S. S. Jadhav, Scientist-D attended meeting with Principal Secretary, Amravathi Secretariat, Andhra Pradesh regarding the allocation of land to ZSI for establishment of Eastern Ghat Regional Centre on 23rd May 2018.
 18. Dr. Sanjeev Kumar attended a meeting under the research programme entitled "Studies on faunal Diversity of Narayan Sarovar WL Sanctuary, (NSWLS), Gujarat" held from 24th to 26th May 2018.
 19. Dr. K. A. Subramanian visited Department of Life Sciences, Manipur Central University, Imphal as external examiner from 28th to 30th May, 2018.
 20. Dr. Kailash Chandra, Director, organized a 'Review Meeting of All India Coordinated Project on Capacity Building in Taxonomy (AICOPTAX)' on 28th and 29th June, 2018 at ZSI, HQs. Dr. Madhumita Biswas, Advisor, MOEF&CC, Dr. Paramjit Singh, Director, BSI, and Prof. A.K. Bhatnagar, Chairman, AICOPTAX, Committee attended the meeting.
 21. Dr. C. Raghunathan attended meeting to evaluate the progress of projects under AICOPTAX scheme of Ministry convened at ZSI, Kolkata on 28th and 29th June 2018 and prepared the Minutes of the Meeting with thrust areas.

22. Dr. Dhriti Bannerji, Dr Avatar Kaur, Ms. Debashree Dam, and Dr. M. Kamalakannan, were deputed to participate in the World Environment Day 2018 exhibition at New Delhi from 31st May to 6th June 2018.
23. Dr. Kailash Chandra, Director attended the meeting under the Chairmanship of AS&FA regarding abolition of posts lying vacant for more than 5 years on 31st May, 2018 at Prithvi Block, MOEF&CC, New Delhi.
24. Dr. Kailash Chandra, Director attended the Eco-Sensitive Zone (ESZ) Expert Committee meeting from 25th to 26th June 2018 in New Delhi.
25. Dr. C. Sivaperuman, attended the National Review Committee Meeting in MoEFCC on 7th June 2018 to present the final technical report of the research project "Foraging ecology of Wading Birds and Shorebirds of Mangrove ecosystem of Andaman Islands" funded by MoEFCC.
26. Dr. Kailash Chandra, Director, convened a meeting in collaboration with BGES company, Kolkata on the development of Bio larvicide to control the larval population of mosquitoes in an eco-friendly manner on 12th July 2018 at Hall, ZSI, HQs. Mr M.G. Dalmia, CEO and Mr Subrata Mukhopadhyay, Chief Technical Officer of BGES company.
27. Dr Raghunathan, Dr Rajkumar Rajan, Dr Anjum Rizvi, Dr Rajmohana, Dr Tripathy attended the meeting for planning the scientific programmes of the International Conference on Status and Protection of Coral reefs (STAPCOP-2018) held at Zoological Survey of India, Kolkata on 13 July 2018.
28. Dr. C. Raghunathan attended 3rd Meeting of Expert Committee for revalidation of potential fishery resources in the Indian EEZ organized at Chennai Zonal Base of Fishery Survey of India, Chennai on 17th July 2018.
29. Dr. Kailash Chandra, Director, attended 2nd Meeting of Steering Committee on R&D Scheme for Conservation and Development from 18th to 19th July 2018 in Brahmaputra Conference Hall, Jor Bagh Road, New Delhi.
30. Dr. Kailash Chandra, Director, attended 1st Meeting of the National Wetlands Committee on 26th July, 2018 at Kaveri Hall, 4th Floor, Prithvi Wing, Indira Paryavaran Bhawan, Jorbagh, New Delhi.
31. Dr. Kailash Chandra, Director, attended meeting for strengthening of forensic capabilities in ZSI, BSI, and WII, chaired by ADIG (Wildlife), MOEFCC on 30th July 2018 at Indus Conference Hall, Jal Wing, Indira Paryavaran Bhawan, New Delhi.
32. Dr. C. Raghunathan attended the RAC meeting at West Bengal State Biodiversity Board on 30th July 2018.
33. Dr. P. Padmanaban, attended "Steering committee meeting Management Plan for Wetlands, Mangroves and Corals of Tamil Nadu" at the Office of the PCCF, Tamil Nadu State Forest Department, Chennai on 13th July 2018.
34. Dr. Deepa Jaiswal, attended Andhra Pradesh State Biodiversity Board meeting on 18th July 2018 at Vijayawada.
35. Dr. Kailash Chandra, Director, attended 2nd meeting of the Consultative Committee of Members of Parliament attached to Ministry of Environment, Forest and Climate Change on the subject Biodiversity held at Parliament House Annexe, New Delhi on 9th August 2018.
36. Dr. B. Sinha attended the meeting of the Arunachal Pradesh Forest Research Committee for Wildlife Protected Areas on 9th August 2018 in the PCCF (WL & BD) office, Itanagar.
37. Dr. Kailash Chandra, Director attended the programme on reintroduction of Indian Mouse Deer at Amrabad Tiger Reserve on 12th August, 2018.
38. Dr. C. Raghunathan chaired the interview committee meeting for the recruitment of Project Fellow and Project Assistant in AICOPTAX - Bryozoa on 13th August 2018.
39. Dr. C. Raghunathan attended Inter-Ministerial Coordination meeting chaired by Hon'ble Minister on 14th August 2018 in the MoEFCC, New Delhi.
40. Dr. Kailash Chandra, Director attended the meeting of Departmental Promotion Committee (DPC) for filling up the post of Assistant Zoologist in ZSI at Prithvi Wing, Indira

- Paryavaran Bhawan, MOEF&CC, New Delhi on 13th August, 2018.
41. Dr. Kailash Chandra, Director attended the fourth meeting of the Inter-Ministerial Group on Environmental-Economic India under the chairmanship of Director General (ES), CSO, held at Conference Hall, Group Floor, Sardar Patel Bhavan, Sansad Marg, New Delhi on 20th August 2018.
 42. Dr. C. Sivaperuman, attended meeting with the Principal Chief Conservator of Forests (Wildlife) on 28th August 2018 to revive the permanent monitoring plot to assess the coral reef and its associated faunal diversity in A & N Islands.
 43. Dr. C. Raghunathan attended Final Meeting of Revalidation Committee for potential fishery resources in the Indian EEZ to be organized at Chennai Zonal Base of Fishery Survey of India, Chennai on 29th August 2018.
 44. Dr. Avtar Kaur Sidhu, and Dr. Indu Sharma, acted as resource person in "Refresher Course on Life Sciences" for enhancing the professional competence of College/University teachers from various states and gave the lecture on "Butterfly diversity of India, their dwindling status and conservation" and "Fish Diversity of North Western Himalaya in relation with Environmental stresses" respectively on 10th September 2019.
 45. Dr. C. Raghunathan attended Eighth Project Steering Committee meeting of the UNEP-GEF project 'Strengthening the implementation of the Biological Diversity Act and Rules with focus on its Access and Benefit Sharing Provisions' held at MoEFCC, New Delhi on 19th September 2018.
 46. Dr. C. Sivaperuman, attended meeting with office of Commandant Indian Coast Guard, Inspector General M.V. Pathak and DIG Thakur on 29th August 2018 to discuss about the proposed Great Nicobar Faunal Expedition during November 2018.
 47. Dr. Kailash Chandra, Director and Dr C. Raghunathan attended re-constituted Steering Committee Meeting (AICOPTAX) in the Botanic Garden of Indian Republic, Botanical Survey of India, Sector 38 A Noida, Uttar Pradesh on 3rd and 4th October 2018.
 48. Dr. Kailash Chandra, Director, attended the 32nd Eco-Sensitive Zone (ESZ) Expert Committee Meeting on 11th October 2018 held at Narmada Hall, Ground Floor, Jal Wing, Indira Paryavaran Bhawan, Jor Bagh Road, MOEFCC, New Delhi to discuss the proposals of Zonal Master Plan (ZMP) of Dehradun and Matheran; attended the 13th CITES Cell meeting on 29th October 2018 to discuss the proposals to COP18 at Krishna Conference Room, 4th Floor, Jal Wing, MOEFCC, IPB, Jor Bagh, New Delhi.
 49. Dr Devanshu Gupta attended a meeting for discussion for finalisation of Fauna Species Listed in Schedules of Indian WL (Protection) Act, 1972 on 11th October 2018 at ZSI HQ, Kolkata under the chairmanship of Director, ZSI.
 50. Dr. C. Raghunathan attended Meeting to discuss the agenda items of CoP-14 to the CBD, CoP-MoP 9 to Cartagena Protocol and CoP -MoP 3 to the Nagoya Protocol at MoEFCC on 30th October 2018.
 51. Dr. C. Raghunathan attended 14th Meeting of the CGPB Committee No XII - Geoscience for Sustainable Development' e held at Ministry of Mines, New Delhi on 31st October 2018.
 52. Dr. C. Sivaperuman, attended Consultation meeting on Coastal and Marine issues in India on 24th October 2018 at MoEFCC, New Delhi organized by UNDP.
 53. Dr. Kailash Chandra, Director organized Half Yearly Monitoring meeting of Regional Centre of Zoological Survey of India during 12th to 13th November 2018. All the Officer-in-Charge of Regional Centres and Committee members from ZSI, HQ participated in the meeting.
 54. Dr. Kailash Chandra, Director, attended meetings from 19th to 26th December 2018. (i) meeting with space application centre for project finalization of coral reef (ii) field site visit to Bhuj and mandvi coast for sea turtle surveys (iii) Discussion with PCCF, Gujarat and World Bank Project authority on new project on Biorocks for coral restoration in Gulf of Kachchh, funded by forest department, Gujarat.
 55. Dr Kailash Chandra, Director and Dr. C. Raghunathan participated in Research Advisory and Monitoring Committee (RAMC) meeting on 20th November, 2018 at ZSI HQ.

56. Dr. B. Sinha attended the meeting of the Arunachal Pradesh Forest Research Committee for Wildlife Protected Areas for grant of research permissions received from various organizations on 29th November 2018 in the PCCF (WL & BD) office, Itanagar.
57. Dr. Kailash Chandra, Director, attended 5th Meeting of Steering Committee on R&D Scheme on Conservation & Development being held on 29th November 2018 at MOEFCC, New Delhi.
58. Dr. Kailash Chandra, Director, attended the consultative meeting in connection with the International Seminar cum workshop on Social Network and Behaviour on Penguins during 29th November 2018 to 1st December 2018 at Ministry of Earth Science, New Delhi.
59. Dr. Kailash Chandra, Director, attended a review meeting with Sri A.K. Jain, Additional Secretary to the Govt. of India, Ministry of Environment, Forests & Climate Change, New Delhi and Smt. Manju Pandey, IPoS, Joint Secretary to the Govt. of India, Ministry of Environment, Forests & Climate Change, New Delhi along with Senior Officer of ZSI & BSI on 4th December 2018 at BSI HQs., Kolkata.
60. Dr. C. Raghunathan attended 52nd Meeting of Expert Committee on Access and Benefit Sharing at National Biodiversity Authority, Chennai on 4th December 2018.
61. Dr. Kailash Chandra, Director, attended the "Steering Committee Meeting" constituted to oversee the development of Botanic Garden of Indian Republic, Noida, at Indira Paryavaran Bhawan, MOEFCC, Jor Bagh, New Delhi on 7th December 2018.
62. Dr L Kosygin Singh attended the 23rd meeting of the National Committee on the introduction of exotic aquatic species into Indian Waters held on 11th December, 2018 in the Krishi Bhawan, New Delhi and provided valuable information about the importance of conservation of Biodiversity.
63. Dr. Kailash Chandra, Director, attended a "Brainstorming-cum-Consultation Meeting of Earth Biogenome Project" in Conference Room, No. 816, 8th Floor, DBT, CGO Complex, New Delhi on 11th December 2018 to discuss India's participation in the Global Mission on Earth Biogenome Project.
64. Shri S.S. Mishra, Scientist-C was nominated and attended the programme "Consultation on Invasive Alien Fish Species: Need for a Risk Benefit Assessment and Management Framework for Healthy Freshwater Ecosystem" held at WWF-India, New Delhi on 19 December, 2018.
65. Dr. C. Raghunathan attended meeting with Minister-in-Charge, Department of Science and Technology and Biotechnology. Government of West Bengal on 21st December 2018.
66. Dr. Kailash Chandra, Director, attended a meeting under the Chairmanship of Shri A.K. Jain, IAS, Additional Secretary with regards to "Setting up of Exhibition at Prayagraj for Kumbh Mela 2019" held at Narmada Conference Hall, Jal Wing, Ground Floor, IPB, MOEFCC, New Delhi on 2nd January 2019.
67. Dr. Kailash Chandra, Director, attended meeting with Prof Neel Kamal Rastogi, and Dr Bhupendra Kumar of Banaras Hindu University, Banaras, UP along with Senior Officials of ZSI, Kolkata at Baini Prasad Hall on 3rd January 2019 for collaboration on AICOPTAX project.
68. All the scientists of ZSI HQ attended a brainstorming session on the "Water Scarcity Issues" in relation to the River Ganga, organised by ZSI, HQs., in the presence of Dr Rajendra Singh (winner of the Magsaysay and Stockholm water prize) at the Annandale Hall on 4th January 2019 under the Chairmanship of Dr Kailash Chandra, Director, ZSI.
69. Dr. Kailash Chandra, Director, attended "Stakeholders meeting for National Environment Survey-a Grid-based Resource Information and Decision Support System (x) for sustainable management of natural resources" under the Chairmanship of Principal Advisor, MOEFCC, New Delhi on 8th January 2019.
70. Dr. G. Maheswaran, attended a meeting to discuss the construction of elevated corridor in East Kolkata Wetlands organized by HIDCO, Kolkata West Bengal on 11th and 12th January 2019.
71. Dr. Gopal Sharma attended an exhibition at KumbhMela, organized by MoEF&CC, New Delhi at Prayagraj from 12th to 22nd January 2019.

72. Dr. G. Maheswaran, attended a meeting on conservation of Northern river terrapin Batagur baska and discussion about Central Asian Flyway (CAF) of migratory birds in Sunderbans organized by West Bengal Forest Department from 22nd and 23rd January, 2019.
73. Dr. Kailash Chandra, Director, attended Brain Storming Session with Shri Mohd. Ilyas Rizvi, PCCF (HoFF), Dr Nalini Mohan, PCCF (WL), Dr Ramana Murthy, PCCF (FR), the officials of Government of Andhra Pradesh, and other dignitaries from various Central and State Government Organizations, held at Guntur, Andhra Pradesh on 24th January 2019.
74. Dr. C. Sivaperuman, attended meeting at the office of Principal Chief Conservator of Forests & Chief Wildlife Warden on 24th January 2019 to finalize the project proposal in connection with the Great Nicobar Biosphere Reserve.
75. Dr. S. S. Jadhav, attended Andhra Pradesh State Biodiversity Board meeting on 25th January 2019 at Vijayawada, Andhra Pradesh.
76. Dr. C. Raghunathan attended the 'Inter-Ministerial Group on Environmental - Economic Accounting - India' held at Ministry of Statistics & Programme Implementation, New Delhi on 7th February 2019.
77. As a member, Dr. B. Sinha attended the 111th Local Committee meeting of Dihang-Dibang Biosphere Reserve in the O/o PCCF, Itanagar on 7th February 2019.
78. Dr. C. Sivaperuman, attended meeting of Stakeholder consultation meeting in connection with the preparation of Management Plan for Rani Jhansi Marine National Park on 11th February 2019.
79. Dr. Kailash Chandra, Director, attended "2nd Steering Committee Meeting" to finalise the notice Inviting Tender Document (NIT) document for engaging Landscape Consultant at Indira Paryavaran Bhawan, Jor Bagh, MOEF&CC, New Delhi on 12th February 2019 and also attended the 2nd meeting of the Programme Advisory Committee (PAC) on Conservation and Management of Mangroves and Coral Reefs under the chairmanship of Dr T. Balasubramanian at Narmada Conference Hall, Indira Payavaran Bhawan Jor Bagh, MOEF&CC, New Delhi on 21st February 2019 .
80. Dr. C. Raghunathan attended the Discussion on draft Notification dated 3rd October 2018 to declare Ecologically Sensitive Areas (ESA) of the Western Ghats to be held at MoEFCC, New Delhi on 15th February 2019.
81. Dr. C. Raghunathan attended review meeting on Coral Reefs and Mangroves held at MoEFCC, New Delhi on 21st February 2019.
82. Dr. G. Maheswaran, attended Conservation of Vultures and Captive Breeding workshop on Vultures at Chalsa, West Bengal from 21st to 24th February, 2019.
83. Dr. Kailash Chandra, Director, attended a meeting with Dr Sujata Rai, IIT Kharagpur to discuss on "National Digital Library" of ZSI documents at ZSI, HQs., Kolkata on 13th February, 2019.
84. Dr. Kailash Chandra, Director attended a meeting with Dr B.B. Barman, Advisor, MoEFCC, New Delhi to discuss the Evaluation and Monitoring of Mangroves and Coral Reef Scheme at Baini Prasad Hall, ZSI, HQs., Kolkata on 25th February, 2019.
85. Dr. Bineesh, K.K. attended the meeting in connection with the Bay of Bengal Research programme at Fishery Survey of India on 25th February 2019.
86. Dr. Kailash Chandra, Director, attended a meeting with Shri Siddhanta Das, Director General of Forest & Special Secretary, MoEFCC, and Shri M.S. Negi, ADG, of Forest, MoEFCC, New Delhi along with Senior Officials of ZSI, Kolkata at Baini Prasad Hall, ZSI, HQs. on 27th February, 2019 and presentations were made on the activities and achievements of the Zoological Survey of India, Kolkata.
87. Dr. C. Sivaperuman, Scientist-E & Officer-in-Charge attended the meeting in connection with the proposed International Workshop on Social Networking Behaviour of Penguins at MoES, New Delhi, IIT Delhi, AIIMS New Delhi, and National Brain Research Centre, Manesar on 27th, 28th February 2019 and 1st March 2019.
88. Dr. C. Sivaperuman, attended the meeting at University of Delhi in connection with the proposed research work on Amphibians in Nicobar group of islands on 27th February 2019.

89. Dr. Anil Mohapatra, participated in Science-policy dialogue on the IPBES Asi-Pacific Regional Assessment for South Asia and West Asia from 27th - 28th, February, 2019 in Kathmandu, Nepal.
90. Dr. C. Raghunathan attended World Ocean Science Congress - 2019 at Vishakhapatnam on 26th and 27th February 2019, and also visited Amaravati, AP to meet the officials regarding the allocation of land for ZSI on 28th February and 1st March 2018.
91. Dr. Kailash Chandra, Director, attended a meeting with Shri C.K. Mishra, IAS, Secretary, MoEFCC, New Delhi and Smt. Manju Pandey, IPoS, Joint Secretary, MoEFCC, New Delhi along with Senior Officers of ZSI, and BSI, Kolkata at Bani Prasad Hall on 7th March, 2019.
92. Dr. C. Raghunathan attended the book release function at MoEFCC in which 13 publications of ZSI on the series of book entitled Fauna of Chhattisgarh released by Hon'ble Minister of Environment, Forest and Climate Change, Government of India released in a brief function held at MoEFCC on 8th March 2019
93. Dr. Kailash Chandra, Director and Dr. C. Raghunathan attended the All India Coordinated Project on Taxonomy (AICOPTAX) Screening Committee Meeting at Brahmaputra Conference Hall, Indira Paryavaran Bhawan, Jor Bagh, New Delhi on 15th March, 2019.
94. Dr. C. Sivaperuman, attended Advisory Committee Meeting at Department of Environment & Forests, on 22nd March 2019.
95. Dr. Rajkumar Rajan, acted as an expert member for the 'Review of mangroves and coral reefs Conservation Programmes of the States', at Ministry of Environment, Forest and Climate Change, New Delhi, which was held on 26 March 2019.
96. Dr. Archana Bahuguna attended 13th Uttarakhand State Biodiversity Board meeting on 26th March, 2019.
97. Dr. Kailash Chandra, Director, and Dr C. Raghunathan attended the Research Advisory and Monitoring Committee Meeting under the chairmanship of Dr S.C. Gairola, Director General, ICFRE, at Northern Regional Centre, Zoological Survey of India, Dehradun from 26th March, 2019.

A person is lying on their back in a field of tall grass. The entire image is covered with a semi-transparent green overlay. Large, light-colored text is positioned on the left side of the image.

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**EVENTS &
ACTIVITIES**

ANNUAL REPORT 2018-19

ZSI is actively
organizing several
activities throughout
the year to create
awareness about the
rich biodiversity of our
Country and its
conservation



Museum galleries inaugurated by Honorable minister Dr. Harsh Vardhan and Governor Sri K. N Tripathy on 9th of May and opened for public.

HARC received award for the best stall in Ujwal Himachal Exhibition



A stall highlighting achievements and work done by DRC, ZSI, Jodhpur was installed at the exhibition held from 13-15 Sept-1

Raj Bhasha Pakhwada celebrated at ZSI-HQ, Kolkata



GSDP valedictory function at ZSI, HQ, Kolkata



Yoga Day Celebration
2018 at ZSI -Kolkata



Dr. Kailash Chandra, Director,
ZSI, Kolkata attended "Brain
Storming Session" arranged by
Forest Department at Aranya
Bhawan, Guntur, Andhra
Pradesh on 24th January 2019.

Review Meeting of
AICOPTAX from 28-
29th June 2018



Hon'ble Dr. Harsh Vardhan, Minister of Environment,
Forest & Climate Change, Science & Technology
visited the centre on 12th August, 2018. Dr. Kailash
Chandra, Director, ZSI, Kolkata felicitated the
Minister and presented the work progress of ZSI at
ZSI, FBRC, Hyderabad.



The centre organized the training
programme for 12 students belonging
to Certificate Course on Para
Taxonomy (including People Bio-
Diversity Register PBR) under Green
Skill Development Programme
(GSDP) under Himachal Pradesh
Council for Science, Technology &
Environment (HIMCOSTE), B-34, SDA
Complex, Shimla (HP) in HARC, ZSI,
Solan on 12th October 2018.



Field at CKBS, Kolkata Visit



INFRASTRUCTURE DEVELOPMENTS





ANNUAL
REPORT

2018/19

Stores Section is responsible for materials management functions of Zoological Survey of India. In view of diverse geographical locations all over the country, all sixteen Regional Centres have been decentralised for their purchases.

GePNIC under CPPP has been implemented at Zoological Survey of India. ZSI has started its e-Procurement through NIC. Zoological Survey of India has also been registered at Government e-Marketplace (GeM) and procurement is also made through GeM.

Online Inventory Management System has been implemented for receipt and issue of items from Stores.

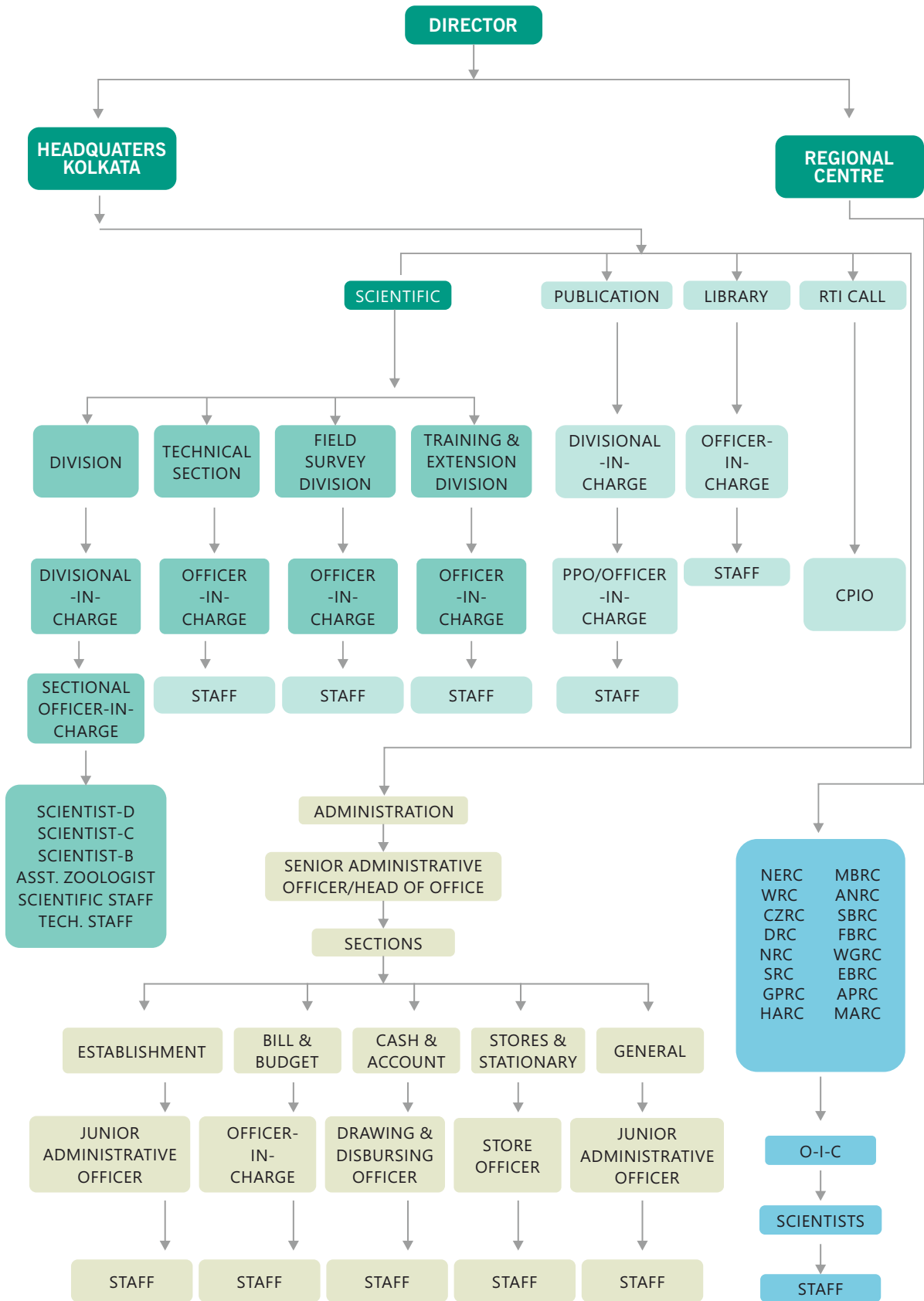
During the period, Zoological Survey of India has procured different items of Video Conferencing System through GeM. Apart from that many Microscopes, Scorpio S11 4WD Vehicles for Regional Centres at Pune, Solan & Hyderabad, Aadhaar Enabled Biometric Attendance Device, Computer, Printer, Camera, etc were procured through GeM.

List of some of the items purchased during the period:

Sl No	Description
1	Trinocular Microscope
2	Trinocular Streozoom Microscope
3	Trinocular Streozoom Microscope with Hybrid LED Illumination
4	Streozoom Binocular Microscope
5	Stereoscopic Zoom Microscope
6	Advance Upright Research Microscope
7	Advance Research Streozoom Microscope with Photographic Attachment
8	Streozoom Microscope
9	Projectors
10	Laptops
11	Work Stations
12	Insect Storage Systems with 150 drawers
13	Insect Storage Box
14	Paper Shredding Machine
15	Digital Camera with underwater housing
16	GPS
17	Water Quality Analyser
18	Interactive Flat Panel display
19	Camera Nikon DSLR D7200
20	UPS 1.0 KVA
21	Online UPS 6.0 KVA
22	Programme & CO2 Controlled Insect Growth Chamber & Upgradable
23	PH Meter
24	Rectified Spirit 96% Strength
25	Biosafe Cabinet Fume Hoods
26	Oven with SS Chamber & Digital Controller
27	Refrigerator Centrifuge
28	Water Bath with Digital Controller
29	B.O.D. Incubator
30	Digital Vortex Mixer 4200 RPM
31	PCR Thermal Cycler Verti
32	Thermomixer Eppendorf
33	Powerlyzer Homozenizer
34	Digital signage
35	Cleaning Materials
36	Common User Items
37	Chemicals
38	Glass Jars

ZOOLOGICAL SURVEY OF INDIA

ORGANIZATIONAL STRUCTURE



A photograph of a dog, possibly a Weimaraner, lying on a grassy field. The image is covered with a semi-transparent teal overlay. On the left side, there are two large, light-colored numbers '7' and '1' stacked vertically. A white bracket is positioned to the right of the number '1', pointing towards the word 'ACCOUNTS' which is written in large, white, bold, sans-serif capital letters.

71 ACCOUNTS



ANNUAL
REPORT

2018-19

Sub-heads as Demand for Grants	Revised Estimate 2018-19	Expenditure Upto the 31.03.19	Balance
Salary	418500000	418367377	132623
Wages	790000	779717	10283
O.T.A.	30000	24857	5143
Medical	6300000	6277771	22229
D.T.E.	23500000	23456237	43763
F.T.E.	640000	631364	8636
O.E.	79000000	78853515	146485
RRT	2200000	2194494	5506
Publication	8800000	8788947	11053
S. & M.	51000000	50980480	19520
Min.Works	20000000	19997193	2807
OCS	30620000	30605943	14057
Grants-in-Aid	30000	30000	0
Sch. & Stp.	9840000	9789322	50678
Other charges	22200000	22195367	4633
Total	673450000	672972584	477416

ACKNOWLEDGEMENTS

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The Hon'ble Minister of Environment, Forest and Climate Change.

The Secretary , Ministry of Environment, Forest and Climate Change.

Additional Secretary , Ministry of Environment, Forest and Climate Change.

Joint Secretary , Ministry of Environment, Forest and Climate Change.



सत्यमेव जयते



Ministry of Environment,
Forest & Climate Change

Zoological Survey
of India, 1916



Zoological Survey of India

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